Psychological aspects and predictors of satisfaction in facial cosmetic surgery

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1 General introduction

A SHORT HISTORY OF FACIAL COSMETIC SURGERY

The first descriptions

Since people were able to write, they have been writing about beauty. Philosophers like Plato and Aristotle found beauty to be one of the greatest desires of men, both male and female. Around 1240 BC, Homerus wrote about the magnificent beauty of Helen of Troy, and till today, we are craving this myth. Over the years, the idea of beauty has changed with each era, but the physical experience of beauty has not changed. The excitement we experience as a response to beauty has been put in a numerous set of words in songs, poems and stories, in plays, films and series, and we can't seem to stop talking about it. [1]

The first description of facial reconstructive surgery can be found in India, around 600 BC. Sushruta, one of the earliest surgeons of the recorded history, described the basic principles of reconstructive surgery in the 'Sushruta Samhita'. In this treatise he described basic principles of reconstructive surgery and various methods to reconstruct different kinds of defects. One of the most famous surgeries he described was the rhinoplasty.

With the making of a new nose using a pedicled forehead flap, even today referred to as the Indian flap, he earned the name of originator of plastic surgery. However, he wasn't really the first. Almost from a thousand years earlier an Egyptian called Ebers Papyrus (1550 BC) described a reconstruction of the nose after rhinectomy, a mutilation that was inflicted as a punishment of criminals. [2, 3](figure 1.1) During the Roman Empire between 27 BC and AD 476, facial plastic surgery was conducted to restore several defects in the patient's face. Aulus Cornelius Celsus published the eight-piece book 'De Medicina' which described techniques from the Alexandrian school to reconstruct the lips, ears and nose.[4] This knowledge got lost after the Imperial Roman collapse, and it took almost 500 years to the next description of plastic surgery. Bald's Leechbook, also known as 'Medicinale Anglicum', was prob-

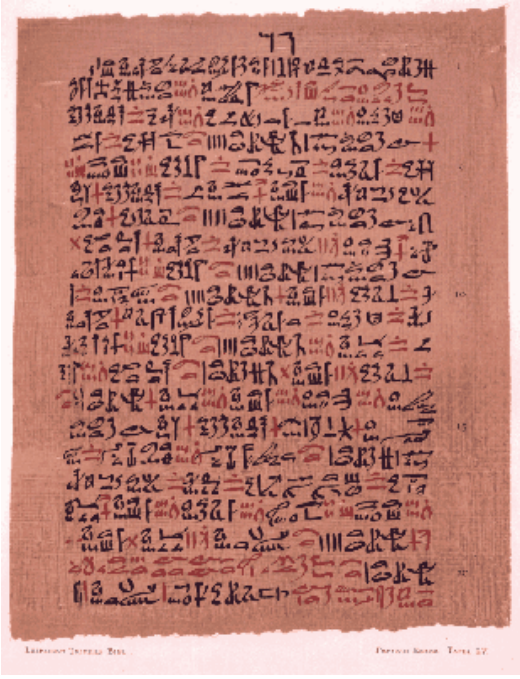

Figure 1.1. Ebers Papyrus

ably compiled in the ninth century and describes different internal and external maladies. Among a wide variety of therapies, it describes particularly the management of a cleft lip. After that, a Flemish surgeon from Ieper called Jan Yperman, described his experiences with the closure of cleft lips in a surgical manuscript in the beginning of the 14th century.

Figure 1.2. Şerafeddin Sabuncuoğlu

Only in the 15th century, the abovementioned original treatise of Sushruta reached western Europe. The original was translated, first to Arabic and after that it travelled over the world from Arabia to Persia to Egypt and eventually to Europe. It was used in the medical atlas by Şerafeddin Sabuncuoğlu, an Ottoman surgeon who lived between 1385-1468.[5](figure 1.2)

Syphilis and the Italian method

The outbreak of syphilis in the 16th century was the origin of further development in cosmetic surgery. Destruction of the nose caused by syphilis was very visible in society which made it a very stigmatizing disease. Syphilitics were treated with 'chirurgia decoratia' to make them less recognizable in society. They were either given an artificial nose for instance or had to undergo painful surgery to reconstruct the face. [6](figure 1.3)

Figure 1.3. Artificial nose

A hundred years later, a surgeon called Gaspare Tagliacozzi lived in Bologna, Italy. He practiced in the so called 'Hospital of Death' on the death bodies of executed criminals. He developed nasal reconstruction using a flap raised from the upper arm. This method is still known by the name 'Italian method'.(figure 1.4) Tagliacozzi described it in a book he published in 1597: 'De Curtorum Chirurgia Per Insitionem' meaning 'The Surgery of Defects by Implantations'. His description of the Italian method is very detailed and it is remarkable how much it corresponds to present techniques. Tagliacozzi is well known for his saying: 'Reconstruction is not performed to please the eye, but rather to cheer the spirit of the one afflicted'.[7] His Italian method was used and improved after that, but it fell into oblivion in the seventeenth century. It was not until 1793 that this method was rediscovered in India. A story about a successful rhinoplasty which was performed by a surgeon in the Poona region was published in a newspaper in Madras. The surgeon used a forehead flap to reconstruct the nose of a patient who's nose was amputated while he was imprisoned during the war. This report was studied by an English surgeon, Joseph Carpue, and in 1814 he performed the same procedure successfully on a military officer. Karl Ferdinand von Graefe, a German surgeon followed their success but used an arm flap to reconstruct the nose of a soldier who's nose was cut off by a sabre.[7, 8] After that, many followed their example.

Figure 1.4. The Italian method

Reconstructive versus cosmetic

There has always been a blurred line between reconstructive surgery and cosmetic surgery. Reconstructive being widely embraced whilst cosmetics having been criticized. As a result of the Age of Enlightenment in the 18th century, people began to choose their appearance to the pursuit of happiness. But what was it, that made people happy? The general idea was that everyone desired to be part of a group, for instance a community or a race. The 'desired

self' that patients pursue would be a person that does not stand out in the desired group. For obvious evolutionary reasons, people have always been trying to 'blend in' and be invisible. This explains why the standards of 'beauty' changes over the ages, to the appearance of the most popular group of that time. [6]

It is also important to consider that before the 19th century, surgery involving the face and head was actually very uncommon. Surgeries on healthy tissues without anesthetics involved a great infliction of pain and there was a major risk of infection in the absence of sterile techniques. Therefore, the invention of general anesthesia using ether, first demonstrated in 1846 by a dentist named William Morton in Boston, was a great leap in the evolution of (facial) surgery. Approximately at the same time, Ignaz Semmelweis tried to convince his colleagues to wash their hands before the examination of women in labor. Although he was despised and put in an asylum for his statements, he reduced 90% of death by childbed fever in his clinic. Only after his death, when his theory was proved by Louis Pasteur, he was referred to as a pioneer of antiseptic procedures. As anesthesia and antiseptics further developed, cosmetic surgery gradually made its entrance.[9]

Rhinoplasty

In 1845, the Berlin physician Johann Friedrich Dieffenbach spoke of a reduction rhinoplasty for the first time in his "Operative Chirurgie". Although he did not describe the technique, this was the beginning of the cosmetic rhinoplasty instead of the reconstructive rhinoplasty. At the end of the 18th century, Jacques Joseph followed up his cosmetic work. Joseph worked in Berlin as the assistant to orthopedic surgeon Professor Dr. Julius Wolff. In 1896 he performed the first correction of the protruding ears of a young boy who didn't want to go to school anymore because of his ears. The surgery was successful and, although it cost him his job with Professor Wolff, brought him renown in Germany.

Two years later he performed and succeeded his first reduction rhinoplasty, which he had practiced first on cadavers. Even then, in the early days of cosmetic surgery, Joseph developed a theory that the psychological aspect of cosmetic surgery was as important as the physical aspects. His work was progressive and he encountered contempt from his surgical colleagues who found that they should not waste their skills on aesthetics. Nevertheless, Joseph's success was recognized and patients were eager to be treated by him. He earned the reputation of the leading facial plastic surgeon in Europe and others came to learn from him. Some of Josephs well-known pupils were Gustave Aufricht, Joseph Safian, Jacques Maliniac, John M. Converse, Abe Silver and Samuel Fomon. Nowadays Joseph is considered to be the founding father of facial plastic surgery in Europe. [10]

At the other side of the Atlantic, Ephraim Ingals, John Roe and Robert Weir further developed cosmetic rhinoplasty techniques and in 1897, Roe described the first total nasal reduction he performed without external incisions. Two well-known names we still come across in everyday nasal surgery are Freer and Killian. In the footsteps of Ingals, Roe and

Weir, they developed a revolutionary method of septoplasty. In the early 20th century they described the technique of submucous resection of septal cartilage and bone with preservation of the L-strut to remain the integrity of the nose.(figure 1.5) The first description of an open rhinoplasty to modify the tip of the nose was written in Budapest, by a surgeon called Rethi in 1921. He was the first to use an incision through the collumella to expose the tip of the nose instead of using an incision on the nasal dorsum.[10]

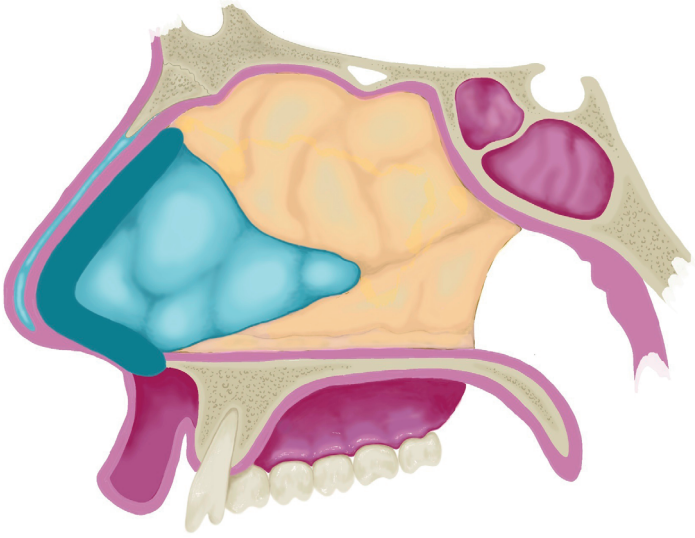

Figure 1.5. Nasal septum with the L-strut highlighted

The war

During the First World War, many soldiers suffered from disfiguring facial injuries. Sir Harold Delf Gillies developed techniques in that time for use in reconstructive surgery. He lived between 1882 and 1960 and was born in New Zealand. He studied medicine at Cambridge University and became an otolaryngologist in 1910. During World War I, he joined the Royal Army Medical Corps. In France, he was impressed by the work of Hippolyte Morestin, who treated patients with injuries of the face and jaw. Back in England he insisted to open a clinic in the Cambridge Military Hospital in Aldershot especially for wounded soldiers with severe facial injuries, mostly inflicted by gunshots. After that, he started a similar department at the Queen Mary's Hospital in Sidcup which eventually became the largest center for facial plastic surgery worldwide. He performed the first form of skin grafting on the heavily burned soldier Walter Ernest O'neil Yeo.(figure 1.6) This soldier lost both his upper and lower eyelids due to burns. The form of skin grafting was called

'tubed pedicle', and Gillies used skin grafts from undamaged areas of the body to form a 'mask' across his face and eyes. [11]

Figure 1.6. Walter Ernest O'neil Yeo

He has also developed the endotracheal tube to be able to operate in the face without the need of a ventilation mask to anaesthetize the patient. Gillies cousin, Archibald McIndoe, joined him in 1930. During the Second World War, Gillies established several plastic surgery clinics in Britain where he, McIndoe and other members of his multi-disciplinary team worked. McIndoe is often recognized for his treatment of deep burns. He also made a great effort to help 'his boys' with rehabilitation and social reintegration.[12] After the Second World War, Gillies established the British Association of Plastic Surgeons and he was the chairman of the International Society of Plastic Surgeons. His book, "Plastic Surgery of the Face" was published in 1920 and became the standard of facial plastic surgery.

Plastic surgery, a separate specialty

In the United States, plastic surgery became a separate specialty In 1924, by starting the first formal training program and fellowship at Johns Hopkins Hospital leaded by Dr. John Davis, the first professor of plastic surgery in de United States. This was shortly followed by the foundation of the American Society of Plastic and Reconstructive Surgeons in 1931, now known as ASPS. [13]

It was not until 1970 that the aforementioned open rhinoplasty technique designed by Aurel Rethi was generally adopted. At a meeting of the American Academy of Facial Plastic and Reconstructive Surgery in Zagreb, the first study of 900 external approach rhinoplasty cases was presented by Ivo F. Padovan. The technique was based on the original work of Rethi. [14] This 'new' technique was brought to Toronto by William Goodman, who refined the "gull-wing" incision. During the same time that Goodman worked in Toronto, another Canadian otolaryngologist named Peter Adamson went to New Orleans to be a fellow with Jack Anderson. Anderson was known for his qualities as facial plastic surgeon and as a teacher. So far he performed rhinoplasties only via endonasal approach. Adamson brought the ideas of the external approach from Goodman in Canada to Anderson in New Orleans. Together, Adamson and Anderson performed hundreds of open rhinoplasties and discovered the added value of this approach. [15] The earlier mentioned Samuel Fomon, who had been a pupil of Jacques Joseph, transferred his facial plastic knowledge to otorhinolaryngology. As plastic surgery became greater and more popular, plastic surgeons began to monopolize their procedures and blocking other specialists from using them. Fomon decided to do something about this and learned everything he could about plastic surgery, to teach it to otolaryngologists. With the encouragement of George Coates, editor of the Archives of Otolaryngology and professor at the University of Pennsylvania, as well as Dean Lierle, chairman of the department of otolaryngology at the University of Iowa, Fomon's course was accepted within the residency program of otolaryngologists.[16] Nowadays, facial cosmetic and reconstructive surgery is being performed by many different specialists in a variety of clinics but with the same goal: the improvement of appearance to pursue happiness for the patient.

PSYCHOLOGY AND COSMETIC SURGERY

Psychological motivations of patients requesting rhinoplasty were investigated for the first time by the before mentioned Jacques Joseph. He described that the psychological depression associated with nasal deformity is far more severe than most surgeons believe. He furthermore described a distinction between 'vanity' and 'antidysplasia' as motivation for seeking rhinoplasty. Vanity being when a person desires "to be more beautiful than the average human being", whereas antidysplasia is interpreted as "the feeling of being disfigured and the aversion to such disfigurement and its emotional and material consequences". According to Joseph, a rhinoplasty should be performed on these patients to restore emotional balance.[17] In 1960, 100 consecutive patients who were seeking cosmetic surgery were referred to a psychiatrist for mental examination. Seventy percent were given a psychiatric diagnosis like neuroticism, a personality trait disorder or even overtly schizophrenic. The expectation of the authors was that psychotic reactions of grave import would be a common complication of the procedure. Many articles from the same period describe the identification of

patients who are psychologically 'unsuitable' for plastic surgery due to a variety of psychiatric disorders. However, the same studies described the unexpected relief of these psychiatric symptoms by a well performed aesthetic procedure and the satisfaction found in patients after the surgery.[18-20] A few decades later, only several patient types were considered psychologically at risk for dissatisfaction after surgery. For instance, the acronym SIMON stands for Single, Immature Males who are Overly expectant and Narcissistic. This is a patient type to be aware of. This is in contrast with SILVIA, the Secure, Young, Listener who is Verbal, Intelligent and Attractive, which is a much better choice of patient with excellent chances of success.[21] Fortunately, in the years that followed, several nuances were added to this point of view and patient selection became a much more personalized dialogue between the people involved. A notorious somatoform disorder in cosmetic surgery is Body Dysmorphic Disorder (BDD). It was first described as "Dysmorphophobia" by the Italian physician Enrique Morselli in 1891. He defined the condition as "the fear of having a deformity".[22] The condition was recognized by the American Psychiatric Association in 1980 and it was categorized as an atypical somatoform disorder in the third Diagnostic and Statistical Manual of Mental Disorders (DSMIII).[23] In 1987 the name was changed to Body Dysmorphic Disorder. Since then, it has been researched and described very often in relation to cosmetic surgery.[24-34] Patients with BDD tend to be preoccupied by a specific feature of their body that they are dissatisfied about. Often, the perceived defect is hardly or not at all recognized by others. In the DSM5, revised in 2013, BDD was reclassified and added to the chapter of Obsessive-Compulsive and Related Disorders" as a psychiatric disease in which patients show a distressing or impairing preoccupation with non-existent or slight defects in their physical appearance.[35] The preoccupation disrupts everyday life, causes substantial mental distress and encourages these patients to seek surgery to restore the defect. However, it has been described that cosmetic surgery generally does not relieve the symptoms of BDD.[27, 36, 37] In the general population, it is estimated that 1-5% of adults has BDD.[38, 39] In patients seeking cosmetic surgery, the prevalence is variable, but much higher. A prevalence of 20-33% is described in rhinoplasty patients.[36]

Psychological aspects are not only of concern before the decision to perform surgery. Postoperatively, the change in appearance can also have a great influence on psychology. Amodeo et al. describe these influences in a review in 2007. The change in appearance as a result of cosmetic surgery is only part of a personal transformation. The positive reactions in social life add up to this transformation and trigger a change of behavior and an improvement in body image. These factors reinforce the psychosocial improvement after surgery. On the other hand, they also state that patient selection is highly important because only patients who are mentally healthy, can have a satisfactory result and improvement in quality of life (QoL) after rhinoplasty.[40]

The concept of health-related QoL was introduced in 1947 by the World Health Organization. They stated that health is not just the absence of disease but also a state of physical, mental and social well-being. The concept was ignored for several decades, until a paper of George Engel appeared in 1978. He described the concept of a biopsychosocial model of medicine, in which he argued that psychosocial information should be included in the formulation of medical concepts, research and patient care.[41] Since then, QoL has appeared in a variety of ways in the medical literature. It has become an essential outcome by which the effect of an intervention is determined. On the other hand it serves as an indicator of impact and suffering from an illness or disease. Patients suffering from cancer or another life threatening or chronic disease experience a reduction of QoL. Anxiety, low self-esteem and mood disorders are frequently described.[42] Obviously, suffering from cancer is different from being unhappy with your appearance. However, the mental impact of being seriously bothered by your appearance and its associated lack of self-esteem and impact in daily life must not be underestimated. Therefore, it is not surprising that patients suffering from an external defect, experience a similar reduced QoL. Patients requesting cosmetic surgery often report a poorer self-consciousness of appearance and a decreased QoL as well. They furthermore express dissatisfaction with a particular body-part.[43] The question is: *Are these patients unsatisfied with their body because of a mental disorder, or are they mentally affected by a disfigured body part?*

AIMS AND OUTLINES FOR THIS THESIS

This thesis aims to describe several aspects of the relationship between facial cosmetic surgery and psychological health. The first aim is to describe personality characteristics that are associated with deteriorated satisfaction after facial cosmetic surgery. Furthermore, the aim is to provide a brief tool for surgeons, to determine these patient characteristics easily in clinic. Secondly, we aim to assess the influence of a decreased self-consciousness of appearance on outcome after rhinoplasty. The third aim of this thesis is to address a specific group within facial cosmetic surgery, being blepharoplasty patients. Blepharoplasty is the most frequently performed facial cosmetic procedure worldwide.[26] However, research concerning the outcome of this procedure in terms of satisfaction and QoL is still lacking. Our aim is to describe patient reported outcomes after blepharoplasty. We furthermore aim to evaluate the prevalence of BDD in this patient group.

In **Chapter 2**, previously described patient characteristics with a possible negative influence on postoperative satisfaction after cosmetic surgery are defined and described in a systematic review of the current literature on the subject.

Concerning our second aim, rhinoplasty is a very frequently performed cosmetic procedure.[26] Psychological distress associated with self-consciousness of appearance is one of the reasons patients seek this surgery and an improvement in QoL after rhinoplasty is often described.[27-31] On the other hand, psychological distress due to psychopathology can be a predictor for poor satisfaction after the surgery. In a prospective study described in **Chapter 3**, we evaluate the relation between appearance related distress pre-operatively and the improvement in QoL due to the surgery, as well as benefit in daily life postoperatively in rhinoplasty patients.

In **Chapter 4.1** and **4.2**, we describe a prospective study on blepharoplasty patients. We have measured satisfaction, self-consciousness of appearance and benefit in daily life pre- and postoperatively in a blepharoplasty patient group.
Furthermore, we analyzed the prevalence of BDD symptoms in blepharoplasty patients. This particular patient group is generally older than most facial cosmetic surgery patients and, in our opinion, seem more worriless. Hence, we hypothesized that the presence of BDD in this group would be lower than measured in, for instance, a rhinoplasty patient group. Furthermore, we measured if patient satisfaction from the surgery is influenced by the presence of BDD symptoms.

Lastly, we describe the development of a survey, to determine the patient characteristics with a negative influence on postoperative satisfaction described in **Chapter 1**. A pilot study, set out in **Chapter 5**, is the second step in the process of developing and validating a new questionnaire. We introduce a brief instrument that has been developed to specifically address these negative predictors.

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2

Negative predictors for satisfaction In patients seeking facial cosmetic surgery: A systematic review

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ABSTRACT

Background: Facial cosmetic surgery is becoming more popular. Patients generally indicate they are satisfied with the results. However, certain patient characteristics have been described as negative predictors for satisfaction. Psychopathology such as Body Dysmorphic Disorder (BDD) and personality disorders are notorious. Psychosocial and cultural factors are more difficult to distinguish. This systematic review defines the predictors, other than BDD, of an unsatisfactory outcome following facial cosmetic surgery. We are also interested to see if valid preoperative assessment instruments are available to determine these factors.

Methods: An extensive systematic PubMed/MEDLINE and Cochrane library search was performed. In addition, relevant studies from the reference lists of the selected articles were added. There were no publication year restrictions and the last search was conducted on July 20th, 2014. All factors described as a negative predictor for patient satisfaction after facial cosmetic surgery were identified.

Results: Twenty-seven articles were analyzed, including eleven prospective studies, two retrospective studies, one case study, eight reviews, and five expert opinions. The following factors were identified: male gender, young age, unrealistic expectations, minimal deformities, demanding patients, surgiholics, relational or familial disturbances, an obsessive personality, and a narcissistic personality.

Conclusions: This review indicates the possible demographic and psychosocial predictors for an unsatisfactory outcome of facial cosmetic surgery. We did not find a brief personality assessment tool that could address the predictors pre-operative. We suggest the Glasgow Benefit Inventory to assess patient satisfaction post-operative. Further research is being undertaken to develop such an instrument.

INTRODUCTION

People are primordially recognized by their face, which is therefore of utmost importance in social life. Consequently, facial surgery may have a great impact on psychological stability. Most patients seek facial cosmetic surgery to improve psychosocial well-being and previous studies indeed described an improved quality of life after well executed cosmetic procedures.[1-3] The idea that psychopathology is very common in patients seeking cosmetic surgery is outdated.[4, 5] Certain psychosocial aspects though, are described to be predictors for an interest in cosmetic surgery.[6, 7] Vanity, low educational level, and a history of being bullied have been found to be positive predictors whereas extraversion, conscientiousness, and emotional stability are negative predictors.[6, 7]

Currently the number of men and women reporting have an interest in cosmetic procedures is rising. Individuals who actually choose cosmetic interventions are generally satisfied with the results and consequently feel better about themselves psychologically.[2] A number of patients however do not feel that way, notwithstanding from the technical success of the procedure. Psychopathology such as Body Dysmorphic Dysorder (BDD) has been identified to predict a poor psychological outcome, a high risk of dissatisfaction with the result, and requesting recurrent surgical interventions.[8-10] Nevertheless, patient characteristics and more subtle psychosocial aspects predicting dissatisfaction have not been properly studied. Certain groups of patients have been described to be at risk for unsatisfactory outcomes, such as patients with unrealistic or high expectations, very demanding patients, and surgiholics.[11] The purpose of this review is to define the aforementioned negative predictors for satisfaction of facial cosmetic surgery and to find out whether there are valid preoperative assessment instruments available to determine these factors.

METHODS

A systematic review of the medical literature was conducted on psychosocial characteristics of patients undergoing facial cosmetic surgery, rhinoplasty and blepharoplasty in particular. The PubMed/MEDLINE databases were consulted on Medical Subject Headings (MeSH) terms 'blepharoplasty', 'rhinoplasty', 'psychology', 'personality', 'self concept', 'body image', 'patient satisfaction', and 'quality of life'. The Cochrane library was consulted for reviews on the subject. Furthermore, we collected studies from the reference lists of the selected articles. There were no publication year restrictions beyond those of the individual databases. The date of the last search was July 20th, 2014. Article titles and abstracts were reviewed to determine their relevance on the subject. The selected studies were searched for all factors described as a negative predictor for patient satisfaction after facial cosmetic surgery in all age groups, including adolescence. In addition, we searched for possible questionnaires that best

addressed these factors. Studies concerning cosmetic procedures other than facial surgery were excluded from this review.

RESULTS

Forty-one studies were identified but 14 of these studies concerned BDD exclusively.[8-10, 12-22] These studies were excluded from this review because BDD is already acknowledged as a psychopathologic condition with an adverse effect on satisfaction after cosmetic surgery. Also, to indicate BDD, validated questionnaires are currently available.[23] Of the remaining 27 articles, 10 encompassed a variety of cosmetic procedures, 16 studies concerned only rhinoplasty patients, and 1 study included face lift patients. No relevant studies were found concerning blepharoplasty alone. Eleven prospective studies, two retrospective studies and one case study were included. Eight articles were reviews and five were expert opinions. The included articles are presented in tables 1-2. The negative outcome predictors that were found in the current literature can be organised in five groups as described in detail below.

Patient characteristics

Male gender is frequently described as a risk for poor outcome, especially in combination with age below 40 years old.[2, 3, 24-27] The acronym SIMON stands for Single and Immature Males, who are Overly expectant and Narcissistic and was presented by Gorney in 2003.[28] Male patients who comply with this acronym are potentially problematic patients.

Slator *et al.* studied psychological health in a group of 41 patients who underwent rhinoplasty at least five years ago. The male patients showed more anxiety and depression than the normal male population and were described as having "female sensitivities for quality of appearance".[29] A retrospective study was conducted by Guyuron *et al.* in 1996 on 468 rhinoplasty patients who underwent primary or revision surgery. In the total sample, the percentage of satisfaction was three times higher in women than in men ($p < 0.01$). Results of dissatisfied patients showed a greater likelihood of dissatisfaction in younger male patients (average age 29.4 years). Conversely, in female patients, older ages were harder to satisfy (average age 43.3 years).[27]

Meyer et al described three different age groups (14-19 years, 20-29 years and 30-43 years) and their motivational patterns for cosmetic surgery in 1960. All patients in the study date the onset of their appearance concerns to the period of adolescence due to self-consciousness and insecurity at this age. The older patients in the study would seek cosmetic surgery because of unfinished tasks of adolescent psychological development. However, Meyer did not find a difference in postoperative disturbance between the three age groups.[30]

Jacobson investigated 18 male patients whom presented seeking cosmetic surgery for minimal deformities, another factor often described as a risk factor. He referred them for psychiatric

Table 2.1. Studies included in this review

Author	Year Surgery	Study type	No. patients	Factors predicting poor outcome
Meyer E. et al.[18]	1960 Rhinoplasty	prospective	30	Minimal deformity, psychopathology
Edgerton M.T. et al.[17]	1960 various cosmetic, face and body	prospective	98	Males, young age, unrealistic expectations, psychopathology
Jacobson, W.E. et al.[24]	1960 various facial cosmetic	prospective	20	Males
Hay G.G. et al.[25]	1973 Rhinoplasty	prospective	17	n.s.
Wright, M.R. et al.[26]	1975 Rhinoplasty	prospective	25	Personality disorders, Marital or familial disaproval, narcissism
Goin M.K. et al.[27]	1980 Face lift	Prospective	50	Surgeon idealisation, previous cosmetic surgery with unsatisfactory outcome, anxiety disorder
Last, U. et al.[28]	1983 Rhinoplasty	Prospective	34	Minimal deformity
Goin M.K. et al.[29]	1991 Rhinoplasty	Prospective	121	anxiety disorder
Ercolani, M. et al. [30]	1999 Rhinoplasty	Prospective	79	minimal deformity
Napoleon et al.[31]	1993 Various cosmetic face and body	prospective	133	Unrealistic expectations
Zojaji, R et al.[32]	2007 Rhinoplasty	Prospective	66	Obsessive, psychasthenic and antisocial personality
Slator, R.et al.[33]	1992 Rhinoplasty	Retrospective	41	Males
Guyuron, B. et al.[34]	1996 Rhinoplasty	Retrospective	468	Males, young age
Knorr N. et al.[35]	1972 Rhinoplasty	Case study	9	unrealistic expectations with secondary gain

(No. patients = Number of patients), (TDMH = The Tennessee Department of Mental Health), (n.s. = not specified), MMPI = Minnesota Multiphasic Personality Inventory).

Table 2.2. Review articles and expert opinions included in this review

Author	Year	Surgery	Study type	No. studies	Factors predicting poor outcome
Sarwer, D.B. et al.[36]	1998	Various cosmetic, face and body	Review	unknown	Body Dismorphic Disorder (BDD)
Sarwer, D.B. et al.[37]	1998	Various cosmetic, face and body	Review	21	n.s.
Castle, D.J. et al.[38]	2002	Various cosmetic, face and body	Review	unknown	Male gender, young age, unrealistic expectations with secondary gain
Honigman, R.J. et al.[39]	2004	Various cosmetic, face and body	Review	37	Male gender, young age, depression, anxiety, BDD, Personality disorder, Relationship issues, unrealistic expectations, minimal deformity, previous surgery with unsatisfactory outcome.
Amodeo, C.A.[40]	2007	Rhinoplasty	Review	30	depressed patients, obsessive patients, uncooperative patients, unrealistic expectations
Tasman A.J. [41]	2010	Rhinoplasty	Review	unknown	SIMON, personality disorder, unrealistic expectations, demanding patients, surgiholics
Palma, P. et al.[42]	2011	Rhinoplasty	Review	unknown	SIMON
Belli,H. et al.[43]	2012	Rhinoplasty	Review	unknown	SIMON, personality disorder
Olley, P.C. et al.[44]	1974	Various cosmetic, face and body	Expert opinion		previous cosmetic surgery with unsatisfactory outcome, relationship issues, unrealistic expectations with secondary gain.
Rohrich, R.J. et al.[45]	2003	Rhinoplasty	Expert opinion		minimal deformities, unrealistic expectations, previous cosmetic surgery with unsatisfactory outcome
Gorney, M.[46]	2007	Various cosmetic, face and body	Expert opinion		great expectations, demanding patient, surgiholic, marital or familial disaprovel, pushed into surgery, incompatibility, BDD.
Gorney, M.[47]	2010	Various cosmetic, face and body	Expert opinion		great expectations, demanding patient, surgiholic, marital or familial disaprovel, pushed into surgery, incompatibility, BDD.
Rohrich, R.J. et al.[48]	2011	Rhinoplasty	Expert opinion		minimal deformities, unrealistic expectations

(No. studies = number of studies), n.s. = not specified), (SIMON = Single Immature Male who is Overly expectant and Narcissistic).

evaluation and all of them were given a psychiatric diagnosis like psychosis, neurosis and several personality trait disorders. According to the author, the main reason for their surgical request was to achieve psychological improvement and they were at risk for unsatisfactory outcome.[25] Last *et al.* assessed 34 women who apply for rhinoplasty. An objective measure of the nasal shape was conducted as well as a subjective perception by the applicants. Furthermore, the subjects were assessed on psychological well-being and identity integration. Results showed a significant correlation between a higher objective degree of deformity and good mental health.[31] In the 'Surgical eligibility guide', Gorney presents his idea of a suitable patient for aesthetic surgery. This guide shows the degree of deformity according to the surgeon and the amount of concern by the patient. A lower degree of deformity combined with a higher amount of concern gives a greater possibility of dissatisfaction regardless of the quality of the result.[32]

Patients' request for surgery

In another study, Gorney sets out the 'red flag characteristics'. The first are patients with high or unrealistic expectations. This is by far the most often described factor of disappointing results after cosmetic surgery.[2, 3, 11, 33-39] These patients demand a total make-over with instantly recognizable positive results.[11, 39] Others give a vague description of their problem and do not seem to know exactly what changes they want. The expectations of the surgical outcome go beyond their appearance and are closely related to success in, for instance, their job and relationships. This phenomenon is often referred to as 'secondary gain'.[35] Gorney also describes the 'demanding patient' as a patient to be wary of. They visit the surgeon's clinic with, for instance, photographs of celebrities and explain exactly what adjustments and changes they want. They do not understand the limitations of the surgery and the unpredictability of human tissue.

History of cosmetic surgery

Several studies advise to be wary of patients who underwent previous cosmetic surgery with an apparent successful result that was met with disappointment by the patient.[11, 35, 37, 40] These patients are often called 'surgiholics' and represent an increasing challenge every time due to scar formation and anatomical changes as a result of the previous procedures. An earlier described characteristic associated with these patients is that they are expecting secondary gain. Goin excluded these types of patients from having a face-lift procedure because they idealized the surgeon and expected him to accomplish what others had failed to do.[40]

Familial disagreement

The motivation to undergo cosmetic surgery should be clear to both patient and surgeon. In a prospective study by Wright *et al.* from 1974, 25 patients accepted for rhinoplasty completed the Minnesota Multiphasic Personality Inventory (MMPI) and had a psychological interview

pre-operatively to establish underlying psychological manifestations. In this study, Wright described patients with decisional disturbances. These patients do not have consensus with their partner or family concerning the surgery or hope that the surgery will improve their relationship. Wright interpreted these disturbances as an absolute surgical contraindication because the surgery will always be a disappointment when it does not lead to the relational improvement that was counted on.[4] Olley *et al.* also considered this type of patient as contraindicated for surgery. He stated that a surgeon should not go along with the procedure if the request for surgery results from social pressure exerted by the patient's partner or family.[35]

Psychopathology

As stated before, the assumption that most patients seeking cosmetic surgery have a psychiatric disorder is outdated. In 1960, Edgerton conducted a study on 98 patients requesting cosmetic surgery whom were interviewed by a psychiatrist. Of this sample, seventy percent were assigned a psychiatric diagnosis. Besides the fact that this number is remarkably high, these patients did not show a significantly higher rate of dissatisfaction. Edgerton therefore stated that a psychiatric diagnosis is not, by definition, a contraindication for surgery, provided that these patients are adequately prepared for it.[33] The 25 rhinoplasty patients studied by Wright were compared to a control group, which had other types of surgery. Results showed that the control group was less fretful, not as much self-critical and less sensitive to the opinion of others than the rhinoplasty group. However, most patients psychologically improved after surgery and were satisfied with the results. Wright noted four psychogenic conditions that warrant special attention, being 'the psychotic individual', 'the psychoneurotic individual', 'decisional disturbances' (described above), and 'the inadequate personality' (personality disorders). These conditions are described in the first edition of Diagnostic and Statistical manual of Mental disorders from 1952 (DSM-I).[41] The inadequate personality includes the infantile narcissistic personality and the manipulative controlling personality, also known as borderline personality disorder. Patients with these conditions should not be operated on without psychiatric consultation as these patients are more likely to deteriorate psychologically after cosmetic surgery.[4]

In 1991, Goin *et al.* studied 200 patients requesting a rhinoplasty. The patients completed several questionnaires pre- and postoperatively concerning self-esteem, expectations of the surgery and psychological well-being. The results showed that pre-operative anxiety correlated with post-operative depression, without having a negative effect on satisfaction.[42] It is notable that in the study of 50 face-lift patients by Goin[40] and the study of 25 rhinoplasty patients by Wright[4], the results of the MMPI exposed no cases of significant psychopathology. Zojaji *et al.* also used the MMPI questionnaire to establish personality traits in 66 patients requesting rhinoplasty. The results of this study show that patients with certain personality traits such as 'obsessivenes' and 'psychastenia' are possibly unsuitable for a cosmetic rhinoplasty.[43]

Table 2.3 Questionnaires used in reviewed studies. (no. patients = number of patients)

Author	Year	Surgery	Study type	No. patients	Questionnaires used
Meyer E. et. al.[18]	1960	Rhinoplasty	prospective study	30	Guilford Zimmerman temperament survey, Tennessee Department of Mental Health (TDMH) self concept scale,
Edgerton M.T. et. al.[17]	1960	Various cosmetic	prospective study	98	psychological tests not otherwise specified
Jacobson, W.E. et. al.[24]	1960	Various facial cosmetic	prospective study	20	Minnesota Multiphase Personality Inventory (MMPI) Guilford Zimmerman temperament survey, TDMH self concept scale,
Hay G.G. et. al.[25]	1973	Rhinoplasty	prospective study	17	Hysteroid-obsessoid questionnaire, five punitive scales, symptom sign inventory
Wright, M.R. et. al.[26]	1975	Rhinoplasty	prospective study	25	MMPI
Goin M.K. et. al.[27]	1980	Face lift	Prospective study	50	MMPI, Beck depression scale, Fundamental Interpersonal Relationship Orientation
Last, U. et.al.[28]	1983	Rhinoplasty	Prospective study	34	Eriksonian identity, Californian psychological inventory (CPI)
Goin M.K. et. al.[29]	1991	Rhinoplasty	Prospective study	121	Brief symptom inventory
Ercolani[30, 49]	1999	Rhinoplasty	Prospective study	79	Maudsley personality inventory (MPI), Scales for neuroticism and Extroversion, Inventory for personality and anxiety testing (IPAT)
Napoleon et.al.[31]	1993	Various cosmetic	prospective study	133	MMPI, Million Multiaxial Clinical Inventory II (MMCI-II)
Zojaji, R et.al.[32]	2007	Rhinoplasty	Prospective study	66	MMPI
Slator, R.[33]	1992	Rhinoplasty	Retrospective study	41	Rust inventory of schizotypal cognitions, Crown-crisp experiential index, Clinical rating scale and personal distress scale.
Guyuron, B. et. al.	1996	Rhinoplasty	Retrospective study	468	psychological tests not otherwise specified

QUESTIONNAIRES

Thirteen studies in this review used one or more questionnaires to assess personality, psychology and psychopathology in their patients. An overview of the used questionnaires is provided in table 3. The most frequently used questionnaire was the aforementioned MMPI.[44] This scale was invented as a guideline for differential diagnoses of psychiatric disorders. Therefore it was based on eight clinical subscales: hypochondriasis, depression, hysteria, psychopathic deviance, paranoia, psychasthenia, schizophrenia, and hypomania. In 1989 the MMPI was revised to remove demoralization from each clinical scale and indicate population characteristics.[45] After that, multiple revisions followed. However, most studies were published before this first revision and used the MMPI solely to exclude psychiatric disorders.[4, 25, 40] The Guilford-Zimmerman Temperament Survey, that is used in two studies, is a personality test developed in 1948 by J.P. Guilford and W.S. Zimmerman. It measures personality characteristics, but in a non-clinical setting, to use in for instance career planning. It consists of 300 items and 10 symptom scales and takes about 30 to 60 minutes to complete.[25, 30] The Tennessee Department of Mental Health (TDMH) self concept scale is also used in two studies and was originally constructed by Fitts in 1955.[46] The scale consists of 100 statements. It was developed to measure 5 external aspects of self-concept and 3 internal aspects. The scale is applicable to subjects in a large range of psychological analysis. However, over the years the validity of the TDMH self concept scale was seriously questioned.[47, 48] Several other questionnaires were only used once in the reviewed studies. An overview of all questionnaires used in the reviewed studies is provided in table 3.

DISCUSSION

The intention of this review was to determine certain patient characteristics and psychosocial aspects, other than BDD, that predict a poor patient satisfaction after facial cosmetic surgery. Another purpose was to find out whether there are valid preoperative assessment instruments available to determine these factors. It is remarkable that most of the existing studies on this subject are rather outdated while quality of life and patient satisfaction have become essential outcomes by which the effect of surgery is determined in medicine today.

Methodological issues

Most studies included in this review suffer from certain methodological deficiencies that inhibit the drawing of convincing conclusions. There were studies with small samples or some level of selection bias.[33, 37] No studies used a randomized controlled design or regression analysis. Furthermore, some studies did not cite their used assessment instruments and its validity.[27, 33] The heterogeneity in patient samples was another difficulty among these studies, especially considering our research question. We were searching for factors that

could impede satisfaction after facial cosmetic procedures. Most of the included studies concerned only rhinoplasties while others concerned various cosmetic procedures, both facial and corporal. It was a challenge to extract only the data concerning the face. However, when looking at studies that included corporal cosmetic procedures, the results are actually quite similar.[2] In addition, heterogeneity in gender and age between the different studies is evident. Rohrich[28] and Jacobson[25] focused on male patients, Meyer[30] included only females and focused on adolescents, as well as the Wright.[4] Guyuron[27] and Edgerton[26] included older patients in their studies. According to the results of these studies, males below the age of 40 are most at risk of dissatisfaction and poor psychological outcome.[24-27]

Psychopathology

During the 60s, there seemed to be a lower threshold than today to ascertain whether or not a patient suffered from a psychiatric disease.[25, 30, 33] Sarwer *et al.* found similar conclusions in studies from the late 40s and described this in a review in 1998. He explains the large number of psychiatric diagnoses back then by saying that patients were interviewed by psychiatrists who were working from a psychoanalytic perspective.[49] In addition, details about the content of the interviews are often unclear which makes it difficult to interpret the outcome properly. Since the 70s though, the notion that most patients seeking cosmetic surgery are suffering from psychiatric diseases was refuted.[4, 5] Studies that used questionnaires instead of interviews to measure psychopathology found a much lower prevalence.[4, 43, 50] Contemporary zeitgeist furthermore dictates that pre-surgical psychiatric interviews are generally not accepted by the patient. Our overall results show that the presence of psychosis or a personality disorder does predict a poor outcome after cosmetic surgery. However, we were looking for more subtle psychosocial aspects such as personality traits and social conditions.

Psychosocial aspects

The psychosocial aspects we were looking for are less concrete and therefore more difficult to measure. The studies that describe these use various or unknown assessment instruments (see also tables 1,2 and 3).[11, 25, 27, 29, 30, 32, 33, 40, 51, 52] Furthermore, many conclusions are formed by expert opinions. After careful consideration, we determined that studies use various terms to address similar aspects. For example, demanding patients and patients unsatisfied after multiple previous surgeries are similar to patients with unrealistic expectations concerning the surgical possibilities. Patients with familial or relational issues who hope the surgery will clear these issues are similar to patients expecting secondary gain. To get a clearer view, we tried to conjoin the similar aspects. Seven final aspects were then acknowledged: 'male gender' (nine studies), 'young age' (seven studies), 'unrealistic expectations concerning the surgical result' (ten studies), 'unrealistic expectations concerning secondary gain' (six studies), 'minimal deformities' (five studies), 'narcissistic personality' (two studies), 'obsessive personality' (two studies). The final aspects are also listed in table 4.

Table 2.4. Final aspects

Author	Year	Final aspects
Meyer E. et al[18]	1960	Minimal deformities
Edgerton M.T. et al[17]	1960	Male gender, Young age, Unrealistic expectations concerning the surgical result
Jacobson, W.E. et al[24]	1960	Male gender
Wright, M.R. et al[26]	1975	Unrealistic expectations concerning secondary gain, narcissistic personality
Goin M.K. et al[27]	1980	Unrealistic expectations concerning secondary gain
Last, U. et.al.[28]	1983	Minimal deformities
Napoleon et.al.[31]	1993	Unrealistic expectations concerning the surgical result
Zojaji, R et.al.[32]	2007	Obsessive personality
Slator, R.[33]	1992	Male gender
Guyuron, B. et al[34]	1996	Male gender, Young age
Knorr N. [35]	1972	Unrealistic expectations concerning the surgical result
Castle, D.J. et al[38]	2002	Male gender, Young age, Unrealistic expectations concerning the surgical result
Honigman, R.J. et al[39]	2004	Male gender, Young age, Unrealistic expectations concerning the surgical result, Unrealistic expectations concerning secondary gain, Minimal deformities
Amodeo, C.A.[40]	2007	Unrealistic expectations concerning the surgical result, obsessive personality
Tasman A.J. et.al.[41]	2010	Male gender, Young age, Unrealistic expectations concerning the surgical result, Unrealistic expectations concerning secondary gain
Palma, P et.al.[42]	2011	Male gender, Young age
Belli,H[43]	2012	Male gender, Young age
Olley, P.C.[44]	1974	Unrealistic expectations concerning the surgical result, Unrealistic expectations concerning secondary gain
Rohrich et.al.[45]	2003	Unrealistic expectations concerning the surgical result, minimal deformities, narcissistic personality
Gorney, M[46]	2007	Unrealistic expectations concerning the surgical result, Unrealistic expectations concerning secondary gain, minimal deformities, narcissistic personality.

Assessment instruments

We were interested whether there are validated assessment instruments available to address the psychosocial aspects. To define patients' expectations and their feasibility, there is a high need of a pre-operative questionnaire to measure patients' expectations concerning the surgical and social outcome. Secondly, a post-operative questionnaire is needed to determine whether or not the expectations were fulfilled. Regarding the first, the included studies do not provide with an instrument that assesses patient expectations on the outcome of surgery. Regarding

the second, we searched for a reliable post-interventional quality of life instrument applicable on facial cosmetic procedures. In several studies other than the ones reviewed here, patient satisfaction after surgery is measured via the Glasgow Benefit Inventory (GBI).[53-57] This inventory measures the change in psychological, social, and physical well-being produced by surgical interventions.[58] The GBI could be a useful tool in future research.

Furthermore, following this review, we should analyze personality features of our patients pre-operatively. To establish these personality features, we need a brief multidimensional personality inventory. The latest revision of the MMPI-2 Restructured Form measures personality characteristics, which qualifies for our purpose but, with 338 items, is not at all brief. The studies reviewed here did not provide another suitable brief personality inventory. An interesting questionnaire that has not been used before in this kind of study is the Big Five inventory. This questionnaire is a self-report personality inventory developed to quantify an individual on the Big Five Factors (dimensions) of personality that were described by Goldberg in 1993.[59] This inventory consist of only 44 items and is therefore a brief instrument, potentially useful in a prospective study.[60, 61] On the other hand, the BFI does not focus specifically on the personality characteristics that we are looking for, such as narcissism and obsessive-compulsive disorders. Further research should focus on the development of an instrument that addresses the negative outcome predictors adequately.

CONCLUSIONS

Preoperative recognition of patients unsuitable for facial cosmetic surgery is important to prevent an unsatisfactory outcome for both patient and surgeon. Although BDD and several other psychiatric disorders are proved to be negative outcome predictors, more subtle psychosocial aspects are not rigorously investigated. This review has indicated seven possible psychosocial aspects: 'male gender', 'young age', 'unrealistic expectations concerning the surgical result', 'unrealistic expectations concerning secondary gain', 'minimal deformities', 'narcissistic personality', and 'obsessive personality'. Validated questionnaires designed for measuring psychosocial aspects are still lacking. An adequate pre-operative assessment of the negative predictors for satisfaction depends on several issues. An interview can provide the surgeon with demographic variables and a certain gut-feeling. To confirm or refute this gut-feeling, further research is ongoing and aimed at developing a brief validated instrument. To assess patient satisfaction with the surgery outcome we suggest the Glasgow Benefit Inventory. Subsequently, a prospective study will be conducted using these instruments. In achieving a better comprehension of our patients we aim to improve satisfaction of both patients and surgeons.

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3

Does self-consciousness of appearance influence postoperative satisfaction in rhinoplasty?

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ABSTRACT

Background: Facial plastic surgeons and patients benefit from knowledge about how psychological aspects can influence the outcome of cosmetic surgery. The influence of pre-operative self-consciousness of appearance and its effect on benefit after surgery in rhinoplasty patients has not been explored before in other studies.

Method: A prospective study was conducted on patients undergoing (septo)rhinoplasty for a combination of cosmetic and functional problems. Before the operation subjects were asked to complete two questionnaires, the Derriford Appearance Scale (DAS59) to measure distress associated with self-consciousness of appearance and the Rhinoplasty Outcome Evaluation (ROE) to measure satisfaction with their nose. Three months after surgery they were asked to complete the ROE again and the Glasgow Benefit Inventory (GBI) to measure benefit of the surgery in daily life. Scores of the pre- and postoperative questionnaires were analyzed and compared. Statistical analysis was performed to determine change after surgery and correlations between the scores.

Subjects: 55 consecutive patients undergoing (septo)rhinoplasty received a letter in which they were asked to participate in the study. 33 patients completed both pre- and postoperative questionnaires. Their mean age was 28 years old.

Main findings: Patient satisfaction improved significantly after the surgery. Lower self-consciousness of appearance before surgery was positively correlated with more benefit after the surgery and a greater change in patient satisfaction with their nose. Males have a lower benefit scores than females.

Conclusions: Patients seeking rhinoplasty have more distress associated with self-consciousness of appearance then a general unconcerned population. They can benefit a lot from a well-executed procedure. A significant improvement in quality of life can be achieved by rhinoplasty. Although males are equally satisfied as females, they benefit less from the surgery in daily life.

INTRODUCTION

Rhinoplasty is one of the most popular facial cosmetic surgical procedures. In an estimation of the international society of aesthetic plastic surgery, approximately 850.000 rhinoplasties were performed worldwide in 2015.[1] The motivation for surgery can be purely aesthetic, purely functional or a combination of both. The combination of functional and aesthetical benefits of a well-executed rhinoplasty explains its popularity.[2] In addition, facial plastic surgery is not something to be ashamed of anymore. The ability to choose your appearance to the pursuit of happiness is not very new, but yet newly accepted. [3] Generally, patients benefit not only physically, but also psychologically from the surgery. Many studies describe an increase in quality of life and psychological wellbeing after rhinoplasty. [2, 4-6]

Opposite of these motivating results there is a small group of patients to be aware of. A relatively high proportion of patients seeking rhinoplasty has Body Dysmorphic Disorder (BDD). [7, 8] These patients are almost impossible to please and, instead of an operation, they need a psychological intervention to deal with their psychiatric disorder. Furthermore, more subtle personality, demographic and psychological aspects should be considered, because they can have a negative influence on the outcome of surgery. In a previous study, we gained insight in seven patient characteristics to predict the level of satisfaction. "Male gender, young age, unrealistic expectations concerning both the surgical result as well as secondary gain, minimal deformities, and both narcissistic and obsessive personality traits seemed to have a negative influence on satisfaction after facial cosmetic surgery. [9] Besides these particular 'high risk' characteristics, many studies mention general terms as psychopathology[10, 11], personality disorders[12-14], depression and anxiety [12, 15, 16] as frequently measured pathology in patients seeking cosmetic surgery, with potential negative influence on satisfaction. On the other hand, Harris et al. suggest that the psychological distress due to poor self-consciousness of appearance in patients with disfigurements is not a predictor for poor satisfaction, but just a result of living with an aesthetic problem of appearance. Furthermore, these patients can show significant benefit of cosmetic surgery. Moreover, he states that more distress due to poor self-consciousness of appearance indicates a higher 'need' for cosmetic surgery.[17] Former studies assessed the impact of cosmetic facial surgery on satisfaction with appearance[18, 19], but the effect of satisfaction with appearance on the outcome of surgery has not been studied yet. In this study, we were interested more specifically in the degree of distress associated with self-consciousness of appearance before surgery. Moreover whether patients with a higher score of distress indeed have more benefit from the surgery. In a prospective study we evaluate this relation between appearance related distress preoperatively and patient benefit postoperatively in a consecutive group of rhinoplasty patients. Furthermore we tried to ascertain in which aspect of well being, physical, psychological or social, patients experience the most benefit.

METHOD

Patients and Materials

We conducted a prospective study on 55 consecutive patients in the Radboud university medical center. Between April 2013 and January 2015 all patients who underwent an open (septo)rhinoplasty were requested to participate in this study. Patients who were not able to complete a Dutch questionnaire were excluded from the study.
Appearance related distress was measured preoperatively by the Derriford Appearance Scale. Patient satisfaction with their nose was pre- and postoperatively measured by the Rhinoplasty Outcome Evaluation. Benefit from the surgery was postoperatively measured by the Glasgow Benefit Inventory (GBI). Specifications of the used questionnaires are set out below.

QUESTIONNAIRES

Derriford Appearance Scale

The Derriford Appearance Scale (DAS59) has been designed and developed by Harris et al. and was published in 2001. It has a good internal consistency (0.98) and test-retest reliability(0.86).[17] This 59-item self-report questionnaire measures psychological distress and the effects on daily life associated with self-consciousness of appearance. The DAS59 consists of five sub-scales: General self-consciousness of appearance (17 items), Social self-consciousness of appearance (20 items), Self-consciousness of sexual and bodily appearance (9 items), Negative self concept (5 items), Self-consciousness of facial appearance (4 items). The items are scored on a 5-point Likert scale from 0 to 4 and a higher score is associated with lower self-consciousness of appearance and more emotional distress. The total DAS scores were obtained by the sum of the individual items. For this study, the DAS59 was translated to Dutch by the rules of forward-backward translation. All participants completed the DAS59 preoperative to measure their self-consciousness.

Rhinoplasty outcome evaluation

The rhinoplasty outcome evaluation (ROE) is a brief assessment tool designed by Alsarraf et al. [20] It is specifically developed for use in a rhinoplasty population and consists of 6 items on functional, aesthetic and social aspects of the nose, scored by the patient itself. It was presented by Alsarraf alongside similar outcome instruments to evaluate other facial cosmetic procedures i.e. blepharoplasty(BOE) and facelift(FOE). The items are scored on a 5-point Likert scale in which 0 represents the worst outcome and 4 represents the best outcome. To calculate the scaled instrument score of the ROE, the cumulative score is divided by 24 and multiplied by 100. The range is then 0-100, with a higher score representing more patient

satisfaction. The ROE is designed to allow the surgeon to easily compare pre- and postoperative measurements. The ROE has already been used in several studies and has proved to be valid and usefull.[2, 21] For this study, the ROE was translated to Dutch by the rules of forward-backward translation. Our patients completed the ROE questionnaire before and three months after surgery.

Glasgow Benefit Inventory

The Glasgow Benefit Inventory (GBI) is a post-intervention questionnaire that assesses patient benefit from an intervention. Therefore it was only used at 3 months postoperatively. In 1996, Robinson et al. developed this questionnaire specifically for otolaryngological interventions. It measures the change in health status as a result of a certain intervention. [22]
It consists of 18 questions based on a 5-point Likert scale. To minimize response bias, half of the questions is reversed. The GBI has a total score and three subscale-scores: general perception of well-being including psychological health benefit, social support benefit and physical health benefit. Total GBI scores are measured by recoding the reversed questions then summing up the individual items and dividing these by 18. This figure, minus 3, is then multiplied by 50. This way, the total scores are ranged between -100 (maximal negative benefit), to 0 (no benefit), to +100(maximal benefit).
A previously translated, Dutch version of the GBI was used, provided by the MRC Institute of Hearing Research.[23]
Participants filled in the DAS59 and the ROE before the operation. Three months after the surgery they completed the ROE and the GBI.

Sample size calculation

Preoperative ROE scores were compared to postoperative ROE scores. A clinically relevant change on the ROE score of 25 points was used to set up the group size. This means that patients score an average of 1 point higher on each individual question postoperatively compared to preoperatively on the 5-point Likert scale. In a power calculation taking alpha=0.05 and a power of 0.90, we established our minimum group size on 32 patients.

Data analysis

The Statistical Package for the Social Sciences (SPSS version 22 for Windows) was used for data analysis. The collected data was checked for normality using Komogorov-Smirnov statistic. As expected, the data proved not to be normally distributed, so further analysis was conducted with non-parametric tests. We used Wilcoxon signed rank tests to compare the pre- and postoperative ROE-scores and p-values < 0.05 were considered significant. DAS59 and GBI scores were calculated and analyzed on differences between males and females using Mann Whitney U tests. Kruskal-Wallis tests were used to compare scores between different age groups.

Preoperative DAS59 scores were compared to the change in ROE scores as well as the GBI scores to correlate distress before surgery with patient satisfaction and benefit from the surgery afterwards. We also compared the different subscales of the DAS59 to assess if all subscales are equally relevant in this group. In addition, the GBI total scores and subscale scores were compared to the ROE scores to correlate both outcome measures and to see which sub domain of the GBI is mostly affected by the outcome of surgery.

RESULTS

Demographics

A total of 33 out of 55 consecutive patients completed both pre- and postoperative questionnaires. This is a response rate of 60%. All patients underwent an open (septo)rhinoplasty for mostly a combination of functional and aesthetic problems. Their mean age was 28 years old (range: 15-60) and 19 (58%) were males. The group of 22 patients that did not complete one or both surveys were excluded from the study. They had a mean age of 35 years old (range: 17-76) and 10 of them were males (45%). The indication for surgery was comparable in both groups.

DAS59 scores

On the DAS59 scale, the mean score was 76 points (range: 19-170). As shown in table 3.1, males had a lower mean score than women (67 points vs. 88 points) but this was not significant. The patients were furthermore divided in three different age groups, <30, 30-50 years and >50 years. The total DAS59 scores showed no significant difference between the age groups.

Table 3.1. DAS59 scores

		n	Mean DAS59 score	*p*
All patients		33	76	
Sex				0,185
	Male	19	67	
	Female	14	88	
Age range, y				0,251
	≤30	21	81	
	30-50	9	77	
	≥50	3	44	

ROE scores

The mean preoperative ROE score of 35 points increased to 74 points postoperative. This is an improvement well above our established clinically relevant improvement of 25 points

and it is a significant difference (p<0,05), with a large effect size (r=0.61). A comparison of the scores of males and females revealed no significant difference in pre- and postoperative ROE scores. No significant difference in ROE scores were found between the three groups. (Table 3.2)

Table 3.2. Pre- and postoperative ROE scores

		n	preoperative	postoperative	difference	*p*	z
Mean ROE scores		33	35	74	39	0,000	-4,735
Sex							
	Male	19	37	70	33	0,000	-3,506
	Female	14	32	79	47	0,001	-3,183
Age range, y							
	≤30	21	35	76	41	0,000	-3,868
	30 - 50	9	36	68	32	0,018	-2,371
	≥50	3	38	75	37	0,109	-1,604
p between age groups			0,990	0,124	0,678		

GBI scores

The postoperative scores on the GBI showed a mean of +15 points (range -14 – 53) indicating a positive benefit. GBI scores are divided in three subscales, general health, social health and physical health. When we look at the three subscales separately, patients reported the largest benefit in the general health scale, including psychological health with a mean score of +20. They showed only little benefit in social and physical health scales, with mean scores of +3 and +6 respectively.

When we compared total GBI scores between males and females, males scored significantly lower than females (7 points vs. 28 points). The total GBI scores showed no significant difference between the age groups. (Table 3.3)

Tabel 3.3. GBI scores

		n	Mean GBI scores	*p*
Total		33	15	
Sex				0,000
	Male	19	7	
	Female	14	28	
Age range, y				0,663
	≤30	21	17	
	30 - 50	9	11	
	≥50	3	15	

Correlations

A strong positive correlation was found between patient satisfaction, measured by the improvement in ROE scores and preoperative appearance related distress measured by the total DAS59 scores, r = 0.623, p < 0.0005. When we looked at the different subscales of the DAS59, this correlation was found in all subscales except facial self-consciousness of appearance (table 3.4). Furthermore, we found a correlation between patient satisfaction and benefit from the surgery with a large effect size r = 0.545, p < 0.005. When looking at the different subscales of the GBI, this correlation was only significant (p < 0,05) in the general subscale and not in the social support subscale and the physical health subscale (table 3.5) Last, we compared preoperative distress associated with self-consciousness of appearance measured by the DAS59 scores, with benefit from the surgery, measured by the GBI scores and found a positive correlation between these two, with a medium effect size r = 0.423, p < 0.05 (table 3.6).

Table 3.4. Correlation between patient satisfaction and distress associated with self consciousness of appearance

		ROE improvement	Total DAS59 score	GSC	SSC	SBSC	NSC	FSC
ROE improvement	Pearson Correlation	1	,623**	,674**	,481**	,362*	,443*	0,260
	Sig. (2-tailed)		0,000	0,000	0,007	0,049	0,016	0,165
	N	30	28	30	30	30	29	30

GSC = General self-consciousness of appearance
SSC = Social self-conciousness of appearance
SBSC = Sexual and bodily self-conciousness of appearance
NSC = Negative self concept
FSC = Facial self-conciousness of appearance
*** Correlation is significant at the 0.05 level (2-tailed).**
**** Correlation is significant at the 0.01 level (2-tailed).**

Table 3.5. Correlation between patient satisfaction and benefit from the surgery in daily life.

		ROE improvement	Total GBI score	GBI GS	GBI SSS	GBI PHS
ROE improvement	Pearson Correlation	1	,545**	,594**	-0,142	0,154
	Sig. (2-tailed)		0,004	0,001	0,471	0,434
	N	30	26	26	28	28

GBI GS = GBI general subscale
GBI SSS = GBI social support subscale
GBI PHS = GBI physical health subscale
**** Correlation is significant at the 0.01 level (2-tailed).**

Table 3.6. Correlation between distress associated with self-consciousness of appearance and benefit from the surgery in daily life.

		Total DAS59 score	Total GBI score
Total DAS59 score	Pearson Correlation	1	,423*
	Sig. (2-tailed)		0,025
	N	31	28

*** Correlation is significant at the 0.05 level (2-tailed).**

DISCUSSION

Our patients scored relatively high on the DAS59 compared to a general unconcerned population, in which scores varied depending on gender and reducing with age.[17] This suggests a higher level of psychological distress and disruption of everyday life, associated with a lower self-consciousness of appearance in our sample. The results of the ROE provide a simple assessment of patient satisfaction related to the procedure. A clinically relevant, significant improvement in satisfaction, independent of gender and age, was found. When looking at the benefit scores of our patients on the GBI, we found scores a little below the range of rhinoplasty patients with a very good surgical outcome, with a low number of postoperative nasal symptoms.[22] Our findings however definitely indicate that our patients generally experienced benefit after rhinoplasty. Benefit in daily life was also related to satisfaction with the surgery. Males, however, have lower benefit scores than females, a difference that Robinson et al. did not address. It is remarkable that, although their pre-operative appearance related distress and pre- and postoperative satisfaction is not different from women, men experience significantly less benefit from the surgery. This is hard to understand but already often described. [10, 12-14, 24-29] Rohrich et al. argued that male patients tend to have a poorer understanding of their deformity than women. They furthermore suppose that man recall less information following the consultation in which surgical possibilities and alternatives are discussed and therefore, of heaving unrealistic expectations.[25] As previously referred to, patients with unrealistic expectations are at risk of being disappointed afterwards, despite a relatively good outcome of the surgery.[9] We found very little benefit in the social and physical health scales and these benefit scales were not related to satisfaction with the nose. These findings suggests that rhinoplasty patients experience predominantly general and psychosocial benefit, but no significant social support benefit or physical health benefit, e.g. patients receive no more familial support and get a cold just as easy. However, it seems logical that an improvement in this regard is not to be expected from rhinoplasty. The study by Robinson describes comparable results on these different subscales in patients specifically undergoing rhinoplasty.[22] These results may vary among patients as some patients mainly have cosmetic problems and others mainly functional.

The major finding in this study is the relation between appearance related distress and the improvement in satisfaction with the nose. Patients suffering more from appearance related distress before surgery, show a greater increase in satisfaction after the surgery. The relation was retrievable in all subscales of the DAS59 except facial self-consciousness of appearance. This subscale mainly contains questions that address on the hairstyle of patients and its possibility to cover up their deformity. Therefore, mean scores for this subscale might be higher in patients having prominent ear correction.[17] This relation between self-consciousness and satisfaction with the nose corresponds with the positive correlation between pre-surgical self-consciousness and benefit following surgery. Although this seems to be as expected, it has been disputed in the past. In a study by Sarwer et al., self-consciousness, or self-esteem, in patients requesting cosmetic surgery is described in detail. Sarwer argues that cosmetic surgery patients obtain a large amount of their self-esteem from their appearance. The degree of dissatisfaction with appearance might be the most important motivation for cosmetic surgery. However, Sarwer states, when the dissatisfaction is out of proportion with the appearance and patient's behavior is significantly affected by it, it may be pathologic and can be an indication of Body Dismorphic Disorder (BDD).[30] There seems to be a thin line between low self-consciousness and psychopathology. It is important to know that, according to our study, higher appearance related distress is not necessarily a negative predictor for the outcome of the surgery. The effect of facial cosmetic surgery on patients goes far beyond appearance alone. Self-consciousness of appearance, one of the key aspects we measured in this study, may well be an evaluation of the outside, but it has an enormous effect on the inside. As mentioned before, patients benefit psychologically from facial cosmetic surgery and it has proved to increase quality of life.[2, 4-6, 31] This multifactorial benefit for patients advocates the clinical need for the procedure.

CONCLUSION

More appearance related distress was found in patients seeking rhinoplasty, compared to the general population. Based on the results of this study, patients who have a higher amount of psychological distress associated with self-consciousness of appearance before the operation, benefit even more from a well-executed procedure. This way, a significant improvement in patient satisfaction can be achieved by rhinoplasty in carefully selected patients. Men seem to benefit a little less than women, even though their increase in satisfaction is equal. Rhinoplasty can have a great effect on appearance, but even a greater effect on self-consciousness of appearance, reducing psychological distress in everyday life.

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4 Blepharoplasty

4.1 Patient-reported outcome measurement in upper blepharoplasty; how to measure what the patient sees.

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ABSTRACT

Background: Blepharochalasis is very common and affects not only appearance but also visual function. Upper blepharoplasty is therefore the most frequently performed facial cosmetic procedure worldwide. It is generally seen as a small procedure with good patient acceptance and postoperative satisfaction. Research concerning the outcome of this procedure in terms of satisfaction and quality of life is lacking, as well as a recommendation on which assessment tools to use in this patient group.

Method: A prospective study was performed on blepharoplasty patients. They were requested to complete a questionnaire preoperatively and 3-6 months postoperatively. The Blepharoplasty Outcome Evaluation (BOE) and the Derriford Appearance Scale (DAS59) were used pre- and postoperatively. Visual analogue scales (VAS) were also used pre- and postoperatively to measure visual impairment and aesthetic aspects of the eyelids. The Glasgow Benefit Inventory (GBI) was used postoperatively

Subjects: Thirty-six patients completed all questionnaires. They had a mean age of 55 years (range 25-73) and 31 were female.

Main findings: Reliability of all questionnaires was moderate to good. Both satisfaction with the eyes and self-esteem improved significantly. Patients reported significant benefit afterwards. All scales showed significant correlations with the exception of several DAS59 subscales.

Conclusions: Upper blepharoplasty can result in great improvement on patient satisfaction, self-consciousness of appearance and benefit in daily life. Only the general subscale of the DAS59 seems relevant to use in this patient group. The BOE and GBI are brief but excellent tools to use in blepharoplasty patients to measure satisfaction and benefit in daily life.

INTRODUCTION

Upper blepharoplasty is the most frequently performed facial cosmetic procedure. Almost 1.400.000 procedures were performed worldwide in 2016 according to the international society of aesthetic plastic surgery.[1] Blepharochalasis and brow ptosis are very common and can occur in all age groups but symptoms mostly increase with age. Blepharochalasis can affect visual function in severe cases although patients often express merely aesthetic concerns. An interesting study by Bullock et al. in 2001 investigated psychosocial implications of blepharoptosis and dermatochalasis. The results showed a negative influence on peoples' first impression of another person.[2]

Overall, increasing dissatisfaction of appearance causes cosmetic surgery to become more popular. In the current zeitgeist, cosmetic surgery is increasingly accepted by society in both men and women. Previous studies report that patients undergoing technically successful cosmetic surgery are generally satisfied with the result and show an improvement in quality of life and body image.[3-6] Studies on the outcome of surgery often focus on the objective outcome. Pre- and post-operative eyelid position and similar lid height are frequently used measurements.[7-9] On the other hand, studies on quality of life and patient satisfaction are rare. Especially when searching for studies using validated questionnaires to assess these values. A valuable contribution in the field is the systematic review of Kosowski et al. This review sets out studies that assess patient reported outcome measures (PROM's) on satisfaction and/or quality of life in surgical and non-surgical facial cosmetic procedures. The study concludes that there is a need for a new PROM, designed to assess satisfaction with facial appearance specifically and to measure quality of life after procedures[10].

In our opinion, the outcome of surgery is never just about the technical outcome and objective measurements. Particularly in cosmetic surgery, satisfaction and the effect patients experience on their daily lives after the surgery is most important. This prospective study focuses therefore on patient satisfaction, procedure related outcome and improvement in self-consciousness of appearance resulting from blepharoplasty, using short validated assessment tools. To support both patients and surgeons, we furthermore search for the psychometrically best assessment tools to use in this particular patient group.

MATERIALS AND METHODS

Patients

A prospective study was performed on a group of 56 blepharoplasty patients in the Radboud university medical center and a private setting in Nijmegen, The Netherlands. All patients undergoing upper eyelid blepharoplasty with or without brow lift were requested to participate in this study. The indication for the procedure was set by one of the certified

facial plastic surgeons (senior authors) in this center. Exclusion criteria were the inability to complete a Dutch written questionnaire and/undergoing a combination of procedures during the same surgery, for example facial nerve rehabilitation surgery or other cosmetic procedures.
Patients were requested to complete a questionnaire preoperatively and 3-6 months postoperatively. Patient satisfaction was pre- and postoperatively measured by the Blepharoplasty Outcome Evaluation (BOE). Distress associated with self-consciousness of appearance was also measured pre- and postoperatively by the Derriford Appearance Scale (DAS59). Visual analogue scales (VAS) were used pre- and postoperatively to measure visual impairment and aesthetic aspects of the eyelids. The Glasgow Benefit Inventory (GBI) was used postoperatively to measure benefit of the surgery in daily life. Details of the used questionnaires are set out below.

Materials

Blepharoplasty outcome evaluation (BOE)

The Blepharoplasty outcome evaluation is a brief outcome assessment tool designed by Alsarraf et al in 2000.[11] It is specifically developed for use in a blepharoplasty population and consists of 6 items on functional, aesthetic and social aspects of the eyes. The items are scored on a 5-point Likert scale. The range is 0–100, with a higher score representing more patient satisfaction.

Derriford appearance scale 59 (DAS59)

The DAS59 has been designed and developed by Harris et al. and was published in 2001.[12] This 59-item self-report questionnaire measures psychological distress and the effects on daily life associated with self-consciousness of appearance. The DAS59 is used pre- and postoperatively to measure specifically the effectiveness of reconstructive and cosmetic surgery. The DAS59 consists of five factorial sub-scales. A higher score is associated with lower self-esteem and more emotional distress.

Visual analogue scales (VAS)

Four visual analogue scales were included in the questionnaires. One scale evaluated visual impairment and three scales evaluated aesthetic aspects of the eyes, first general satisfaction of their eyes, second satisfaction of the upper eyelids and third satisfaction of their lower eyelids. In all four scales, a straight horizontal line of 100mm was given. Patients were asked to mark the satisfaction of the abovementioned aspects on the line. The far left end being very unsatisfied and the far right end being very satisfied.

Glasgow Benefit Inventory (GBI)

The Glasgow Benefit Inventory (GBI) is a post-intervention questionnaire which assesses patient benefit from an intervention. Therefore it was only used postoperative in this study. It was developed by Robinson et al. in 1996[13] for otorhinolaryngological interventions and it measures the change in health status produced by the intervention. It consists of 18 questions based on a 5-point Likert scale. All the scores range from –100(maximal negative benefit), to 0 (no benefit), to+100(maximal benefit).[13]

Statistical analysis

Data-analysis was performed using the Statistical Package for the Social Sciences (SPSS version 20 for Windows). Internal consistency of the scales was assessed by Cronbach's alpha. Calculations of the group size were based on an improvement on the Blepharoplasty Outcome Evaluation of 25 points. This means that patients score an average of 1 point higher on each 5-point question and this was considered clinically relevant by the authors in the absence of a known significant criterion. Based on a power calculation with alpha=0.05 and a power of 0.90, we needed to include at least 32 patients. Missing values were excluded pair wise in the analysis. Our data were checked for normal distribution using Komogorov-Smirnov statistic. Because the data proved not to be normally distributed, further analysis was conducted with non-parametric tests. We used Wilcoxon signed rank tests to compare the pre- and postoperative measures. Values of $p < 0.05$ were considered significant. Effect size was calculated with Cohen criteria (r) of 0.1 = small effect, 0.3 = medium effect, 0.5 = large effect.

RESULTS

Patients

Thirty-six patients completed all pre- and postoperative questionnaires. They had a mean age of 55 years (range 25-73) and 31 out of 36 patients were female. An independent T-test showed no significant differences between the outcome of the several questionnaires between males and females. There was no significant correlation found between age and the outcome of the several scales. Further demographics of the study group are displayed in table 4.1.

Scales

Internal consistency describes the extent to which all the items in a test measure the same concept. To determine internal consistency of the various measurement instruments, Cronbach's alphas were calculated. Cronbach's alphas of the BOE, DAS59 and GBI were all above 0.7 in this study. This implies moderate to good reliability of the questionnaires.

Table 4.1. Demographic characteristics of the study group

	No. of subjects n (%)
Gender	
Male	5 (14)
Female	31 (86)
Age	
Mean (min-max)	55 (25-73)
Std Deviation	10
Marital status	
Single	4 (11)
Living together	6 (17)
Married	20 (56)
Divorced	3 (8)
Widow(er)	3 (8)
Previous other cosmetic surgery	
yes	5 (14)
No	31 (86)
Previous eyelid surgery	
Yes	3 (8)
No	33 (92)

Pre- and postoperative scores

The median score on the BOE increased from 25 preoperative to 77 postoperative, indicating improved patients' satisfaction. A Wilcoxon signed rank test revealed a statistically significant increase in BOE scores after blepharoplasty, $z = -5.236$, $p < 0.01$. Pre- and postoperative median scores on the DAS59 reduced from 61 points preoperatively to 43 points postoperatively, indicating an increase in self-esteem and a decrease of emotional distress. The Wilcoxon signed rank test showed that this improvement was statistically significant, $z = -2.488$, $p < 0.05$. This significant improvement was not found in the five factorial subscales of the DAS59. Only the subscale 'General self-consciousness of appearance' showed a significant improvement, $z = -3{,}316$, $P < 0.01$. The pre- and postoperative VAS scores on aesthetic aspects and visual impairment were analyzed in the same manner. We found a significant improvement on all scales. The visual impairment VAS score improved significantly with a mean score increasing from 5.4 to 9.1, $z = -3.977$, $p < 0.01$. The aesthetic VAS scale concerning both eyelids had a mean gain from 3.3 to 8.3, $z = -5.102$, $p < 0.01$. The mean VAS scores on upper eyelid aesthetics increased from 2.9 to 8.4, $z = -5.024$, $p < 0.01$. The aesthetic VAS score concerning the lower eyelids had a mean gain from 7.1 to 8.0, $z = -2.014$, $p < 0.05$. (Table 4.2)

Table 4.2. Difference between pre- and postoperative questionnaire scores

	Preoperative	Postoperative	Significance (p)	Wilcoxon signed rank test (z)
BOE	25	77	<0.01	-5.236
DAS59	61	43	<0.05	-2.488
VAS aesthetic				
both eyelids	3.3	8.3	<0.01	-5.102
upper eyelids	2.9	8.4	<0.01	-5.024
lower eyelids	7.1	8.0	<0.05	-2.014
VAS vision	5.4	9.1	<0.01	-3.977

Benefit

The range of total scores on the GBI in this study were from -52.78 to 55.56 with a positive mean score of 10.92 and standard deviation of 18.23. The median score was 9.72. Skewness is negative (-0,815) indicating a clustering of scores at the positive end. Kurtosis is positive (4.991), indicating the distribution is rather peaked.

Correlations

There was a strong positive correlation between satisfaction as measured by the BOE and benefit measured by the GBI, $r = 0.525$, $p < 0.01$. Improvement on the BOE scores was also positively correlated with the improvement on both VAS scales, respectively $r = 0.640$, $p < 0.01$ and $r = 0.350$, $p < 0.05$. Furthermore, GBI scores were positively correlated with the VAS scores on aesthetic improvement but not with the VAS score on visual improvement. There was no (reversed) correlation found between total DAS59 scores and improvement on the BOE, GBI scores or VAS scores. However, we did find a correlation between the improvement on the general subscale of the DAS59 and improvement on the BOE scores $r = 0.586$, $P<0.01$ and aesthetic VAS scale $r = 0.451$, $p<0.05$, as well as with the total GBI scores $r = 0.532$, $p<0.01$. All other subscales did not show this correlation. (Table 4.3).

Table 4.3. Correlations between benefit scores and pre- and postoperative improvement on the different scales

		BOE improvement	VAS aesthetic Improvement	VAS visual improvement	DAS59 general improvement	GBI total
BOE improvement	Pearson Correlation	1	0.640	0.350	0.586	0.525
	Sig. (2-tailed)		<0.01	<0.05	<0.01	<0.01
VAS Aesthetic improvement	Pearson Correlation	0.640	1	0.192	0.451	0.547
	Sig. (2-tailed)	<0.01		0.327	<0.05	<0.01
VAS visual improvement	Pearson Correlation	0.350	0.192	1	0.220	0.334
	Sig. (2-tailed)	<0.05	0.327		0.226	0.088
DAS59 general improvement	Pearson Correlation	0.586	0.451	0.220	1	0.532
	Sig. (2-tailed)	<0.01	<0.05	0.226		<0.01
GBI total	Pearson Correlation	0.525	0.547	0.334	0.532	1
	Sig. (2-tailed)	<0.01	<0.01	0.088	<0.01	

DISCUSSION

The results of this study show the improvement in patient satisfaction, reduction of psychological distress associated with self-consciousness of appearance and benefit in daily life resulting from upper eyelid blepharoplasty. To our knowledge, there is no previous study describing similar measurements in an exclusively blepharoplasty patient group. However, in a study by Sarwer et al., patient satisfaction, body image and self-appearance is measured in patients before and after various cosmetic procedures, among which blepharoplasty[14]. Sarwer describes that 87% of all patients were 'somewhat' or 'extremely satisfied' after cosmetic surgery and found significant improvements in body image and self-appearance. Questionnaires that were used in the study by Sarwer were different. They used two body image related questionnaires that were focused on the whole body instead of a specific part. Three questionnaires focused on Body Dysmorphic Disorder and negative emotions, which we did not assess in this particular study. Last, Sarwer used a self-appearance scale developed in 1965. The questionnaires used in the current study were more focused on the specific body part we wanted to address and furthermore we preferred a more recent self-appearance scale.

The median progression in patient satisfaction as we measured by the BOE scores was 46 points, which is almost twice as high as the authors decided to be a clinically relevant improvement prior to the study. These result are supported by the improvement on self-consciousness of appearance as measured by the DAS59. With regard to the DAS59 scores however, only the subscale 'General self-consciousness of appearance' seemed to matter in this study. The other four out of five factorial subscales did not show a significant improvement post-operatively and did not correlate with the other scales. A possible explanation is the fact that the preoperative results already showed quite positive scores on these subscales and there is not a lot of improvement that can be achieved after surgery. This might mean that, although dermatochalasis is experienced as troublesome, it has little effect on social life and self- appearance, and these subscales are not very relevant in this group. It is also possible that our patient sample is too small to find significant results on the subscales that contain only a few questions each.

The correlation between the improvement on the BOE and VAS scores and the degree of benefit measured by the GBI indicates that each of these three pre- and/or postoperative scales give an accurate representation of the outcome of the surgery. Only the general self-consciousness of appearance subscale of the DAS59 correlates with the BOE. This suggests again that the other subscales of the DAS59 are less valuable in outcome measurement within a blepharoplasty patient group.

The VAS scores evaluated visual impairment, aesthetic satisfaction of the eyes in general, the upper eyelids and the lower eyelids. Patients showed significant improvement on all four scales, but the improvement on the lower eyelid aesthetics was much smaller, which

was to be expected. Mostly because the score on this particular VAS scale was already quite high preoperatively (7.1 vs. 3.3 and 2.9 on the other two aesthetic scales). Although these scales show excellent correlation with the results of the BOE and GBI, it might be harder to compare the results with other studies, because these scales were designed for this particular study. Other studies might use approximately the same VAS scores but just use slightly different definitions[15]. This study therefore supports the use of the BOE and GBI as patient reported outcome measures in blepharoplasty patients.

The earlier mentioned review by Kosowski criticizes both the GBI as well as the BOE, ROE and FOE on their development or psychometric properties[10]. Although these conclusions have their merit, certain reservations can be made with regard to validity and reliability. This study, as well as a previous study by the same authors[16], show convincing correlations between the results of the BOE or ROE and the DAS59 and GBI scores. This suggests construct validity of these scales. Criterion validity might be concluded in this study from the results of the BOE and GBI scores and their correlations with the VAS scales. Also, as mentioned earlier, reliability of the BOE, DAS59 and GBI were moderate to good, with Cronbach's alphas all above 0.7. In our opinion, these findings encourage the use of these scales. In 2010, Klassen et al. introduced the FACE-Q, a well validated PRO instrument developed for quality of life assessment in cosmetic procedures on all parts of the face[17]. Since this instrument is very extensive, it includes over 40 independent functioning scales and checklists that measure several aspects, it did not qualify in our search for a brief, easy to use questionnaire. Furthermore, the FACE-Q was developed for use in all facial cosmetic procedures and we were looking for a more procedure specific scale. Only in 2017, Klassen et al. published the development and validation of a specific eye-module, which seems very promising[18]. However, most data collection of the current study was already completed by that time. In future studies we suggest the comparison of this new instrument with the BOE and GBI in a blepharoplasty patient group. Also, we suggest a longer duration of patient follow-up to provide knowledge on lasting results after blepharoplasty.

CONCLUSION

This study shows that a well performed upper eyelid blepharoplasty can result in great improvement on patient satisfaction, self-consciousness of appearance and benefit in daily life. The BOE is a brief, easy to use, valid outcome assessment tool to be used before as well as after the surgery in blepharoplasty patients. In addition, the GBI is an excellent tool to use in blepharoplasty patients to assess benefit of the surgery in daily life.

Since only the general subscale of the DAS59 seems relevant in this particular patient group, we do not suggest to use the complete scale in blepharoplasty patients. VAS scores give a quick insight on improvement but are more difficult to compare with other studies. The

combination of the BOE and GBI only can give an accurate insight in the functional, aesthetic and psychological outcome, while still a very brief combination of questionnaires.

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4.2

Prevalence of Body Dysmorphic Disorder symptoms in blepharoplasty patients: The influence on outcome and satisfaction after surgery.

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ABSTRACT

Body dysmorphic disorder (BDD) is a psychiatric disorder with a prevalence of 10-25% in cosmetic surgery patients (Veale et al., 2003), and is related to poor postoperative outcomes. Blepharoplasty is considered a minor procedure with the purpose of rejuvenation. This prospective study on 36 blepharoplasty patients analyses the presence of BDD in blepharoplasty patients and its effect on satisfaction, disability, self-consciousness and benefit from the surgery. BDD symptoms were measured by the Body Dysmorphic Disorder Questionnaire – Aesthetic Version (BDDQ-AS) and Body Dysmorphic Disorder Yale-Brown Obsessive Compulsive Scale (BDD Y-BOCS). Patients also completed several patient reported outcome measures pre- and postoperatively. Nine patients (25%) met the BDDQ-AS diagnostic criteria for BDD. Two patients (5.5%) also met the BDD Y-BOCS diagnostic criteria of BDD. Based on current literature, the 25% measured by the BDDQ-AS seems overestimated. Preoperatively, patients with BDD symptoms were less satisfied with their eyes, had lower self-consciousness and more disability than patients without BDD. Postoperatively, satisfaction, self-consciousness and benefit was not different but disability was still higher in the BDD group. The results implicate that BDD prevalence in blepharoplasty patients is similar to other cosmetic surgery patients. This seems however, to have little effect on outcome of surgery.

INTRODUCTION

Blepharoplasty, the surgical rejuvenation of the eyelids, is a frequently performed cosmetic procedure. Although patients are generally satisfied with the results of cosmetic eyelid procedures, some patients have negative emotions about the result of the cosmetic procedure afterwards.[7] Apart from objective failures, some patients are overly expectant about the results or they are dissatisfied because of subjective interpretation of the surgical results.[8] Psychopathology, and especially Body Dysmorphic Disorder (BDD) is a notorious condition in patients seeking cosmetic surgery.[9] BDD is described in the Diagnostic and Statistical Manual of Mental Disorders 5th Edition (DSM-5) in the chapter of "Obsessive-Compulsive and Related Disorders" as a psychiatric disease in which patients show a distressing or impairing preoccupation with non-existent or slight defects in their physical appearance[10]. BDD patients have a preoccupation with their appearance and often have intrusive thoughts about a specific feature. They may show compulsive behaviour in an attempt to calm anxieties concerning their appearance. Patients suffering from BDD are assumed to have a negative, subjective view on the post-operative outcomes of their facial cosmetic surgery in comparison to normal patients. Even discrete preoperative symptoms of BDD are related to poor postoperative outcomes in rhinoplasty.[11] When operated on, patients with BDD are very hard to please and experience deterioration of their psychological well-being postoperatively.[11]

In cases of rhinoplasty, several studies have shown a high but variable BDD incidence of 20% - 33% which is much higher than found in the general population which is about 1-7%.[1,2] Postoperative satisfaction after rhinoplasty has proven to be deteriorated in patients suffering from BDD.[12]

We were interested in the incidence of BDD symptoms in blepharoplasty patients. In our opinion, characteristics of patients requesting blepharoplasty differ from patients requesting cosmetic rhinoplasty. Patients are generally older and mostly seek functional improvement in combination with 'some rejuvenation' instead of 'purely beautification'. Because of this partly functional aspect of blepharoplasty, BDD symptom rates in blepharoplasty patients are hypothetically lower than previously found in rhinoplasty patients. This prospective study evaluates patients requesting blepharoplasty with regard to symptoms of BDD. In addition, we compare patients with and without BDD symptoms and we study the correlation of BDD symptoms with pre- and postoperative satisfaction, disability in daily life, psychological distress associated with self-consciousness of appearance and general benefit after the surgery.

METHODS

Procedure

We conducted a prospective study on 56 patients requesting upper blepharoplasty between April 2013 and September 2016. Their indication was set by one of the three certified facial plastic surgeons affiliated to the Otorhinolaryngology department of the Radboud university medical center. Subjects were excluded from the study when they underwent a combination of reconstructive procedures and in case of the inability to complete a Dutch written questionnaire.

Patients were asked to complete a written questionnaire preoperatively and 3-6 months postoperatively. The nature and severity of BDD symptoms were measured both pre- and postoperatively by the Body Dysmorphic Disorder Questionnaire – Aesthetic Version (BDDQ-AS) and the Body Dysmorphic Disorder Yale Brown Obsessive Compulsive Scale (BDD Y-BOCS). [3-6] Evaluation of patient satisfaction with their eyelids was measured pre- and postoperatively by use of the Blepharoplasty Outcome Evaluation (BOE).[13] Psychological distress associated with self-consciousness of appearance was measured pre- and postoperatively with the Derriford Appearance Scale (DAS59).[14] Benefit from the surgery was postoperatively measured by the Glasgow Benefit Inventory (GBI).[15] The Sheehan Disability Scale (SDS) was used pre- and postoperatively to measure eyelid-related symptoms and disability in daily life.[16] The scales we used all address a certain aspect of outcome measurement in cosmetic surgery. To be able to assess influence of BDD on all these aspects, we decided to use this broad variety of scales in this study.

Questionnaires

Body Dysmorphic Disorder Questionnaire – Aesthetic Version (BDDQ-AS)

Originally, the Body Dysmorphic Disorder Questionnaire was developed by Philips et al. in 1995.[3] It consisted of 4 sets of questions and is based on the standard definition of BDD described in the DSM-IV. In 2001, Dufresne et al.[4] modified the scale into the BDDQ-Dermatology Version, to screen dermatological cosmetic surgery patients for BDD. This scale was further adapted by Picavet et al. into the Aesthetic Version, to make it less time consuming and easy to interpret by the aesthetic surgeon.[5] Patients score positive for BDD on the BDDQ-AS if they indicate to be concerned with their appearance, preoccupied with their appearance and at least moderately distressed or impaired in daily life because of these concerns. Reliability of the BDDQ-AS has shown to be adequate, with Cronbach's alpha of 0.83 for rhinoplasty patients and 0.84 for controls. Sensitivity is 89.6% and specificity is 81.4%.[17]

Body Dysmophic Disorder Yale-Brown Obsessive Compulsive Scale (BDD Y-BOCS)
Phillips et al. developed BDD Y-BOCS in 1997.[6] It is a variation on the original Y-BOCS to evaluate obsessive compulsive disorder. The purpose of the questionnaire is to measure the severity and nature of symptoms during the past week in patients with BDD. The BDD Y-BOCS consists of 10 items on a 5-point Likert scale (0-4). A total score of ≥20 indicates the presence of BDD. This cut off point is used in most studies and this is consistent with the widely used cut off point of 16 on the Y-BOCS to determine the presence of obsessive compulsive disorder (OCD). The BDD Y-BOCS has shown excellent reliability with Cronbach's alpha of 0.918 in rhinoplasty patients and it is the most widely used scale to measure BDD and its severity.[18,19]

Blepharoplasty Outcome Evaluation (BOE)
The Blepharoplasty outcome evaluation is a brief outcome assessment tool designed by Alsarraf et al for use in blepharoplasty patients.[13] Six items are pre- and postoperatively scored on a 5-point Likert scale in which 0 represents the worst outcome and 4 represents the best outcome. The improvement of postoperative scores relative to the preoperative scores provide the surgeon insight in the benefit of the procedure.

Derriford Appearance Scale 59 (DAS59)
This 59-item self-report questionnaire was developed by Harris et al. in 2001.[14] The DAS59 measures psychological distress and the effects on daily life associated with self-consciousness of appearance. The DAS59 is used pre- and postoperatively to specifically measure the effectiveness of reconstructive and cosmetic surgery on self-consciousness of appearance. The questions are divided in five factorial sub-scales. A higher score is associated with lower self esteem and more emotional distress.

Glasgow Benefit Inventory (GBI)
The Glasgow Benefit Inventory (GBI) is a post-intervention questionnaire which assesses patient benefit from an intervention. Therefore it was only used postoperative in this study. It was developed by Robinson et al. in 1996, especially for otorhinolaryngological interventions and it measures the change in health status produced by the intervention. [15] It consists of 18 questions based on a 5-point Likert scale. The total scores range from –100(maximal negative benefit), to 0 (no benefit), to +100(maximal positive benefit).[15]

Sheehan Disability Scales (SDS)
This short disability scale was developed by Sheehan et al. in 1996.[16] It is a brief and sensitive measurement of three 10-item questions. The relevance of this assessment is that disability and severity of symptoms are not always correlated. These three questions measure disability in work, social life and family life independent from the severity of the symptoms.

In general, psychiatric patients score higher on disability scales compared to patients with chronic medical illnesses. It is used pre- and post-operatively to measure quality of life and improvement by the surgical intervention.

Statistical analysis

The Statistical Package for the Social Sciences (SPSS version 20 for Windows) was used to analyse the data. First, the internal consistency of the selected questionnaires was measured to check reliability of the scales using Cronbach's alpha values. Normality of the distribution of the data was assessed using Kolmogorov-Smirnov statistic. Missing values were excluded pair wise in the analysis.

Preoperative BOE scores were compared to postoperative BOE scores. A clinically significant change on the BOE scores of 25 points was used to calculate the sample size. This change means that patients improve an average of one point per question on the BOE. In a power calculation taking alpha=0.05 and a power of 0.90, we established our minimum group size on 32 patients.

RESULTS

Internal consistency of the questionnaires and normality of the data

Although there were two scales with less than 10 items, Cronbach's alpha values were above 0.7 in all scales, suggesting adequate internal consistency reliability. The results of the Kolmogorov-Smirnov statistic showed that the distribution of our data was not normal. The data obtained by the questionnaires was therefore further analyzed using Independent Sample Mann Whitney U Tests. p-Values of < 0.05 were considered significant.

Patients

Thirty-six out of 56 patients completed all pre- and postoperative questionnaires, this is a response rate of 64%. The mean age was 55 years (range 25 - 73), 94% of the patients were over 40 years old. Thirty-one of them were females (86%). All patients received the surgery by one of three facial plastic surgeons either in the Radboud university medical center or in a private practice. Two patients had a psychiatric history. Three patients had previous eyelid surgery and five patients underwent different cosmetic procedures before. The majority of patients were in a committed relationship. Demographics of the included patients are displayed in table 4.4.

Table 4.4. Demographic characteristics of the study group

	No. of subjects n (%)
Gender	
Male	5 (14)
Female	31 (86)
Age	
Mean (min-max)	55 (25-73)
Std Deviation	10
Marital status	
Single	4 (11)
Living together	6 (17)
Married	20 (56)
Divorced	3 (8)
Widow(er)	3 (8)
Psychiatric disorder	
Yes	2 (6)
No	34 (94)
Previous other cosmetic surgery	
yes	5 (14)
No	31 (86)
Previous eyelid surgery	
Yes	3 (8)
No	33 (92)

Prevalence of Body Dysmorphic Disorder symptoms.

Two of the thirty-six patients (5.6%) met the diagnostic criteria of BDD on the BDD Y-BOCS (score ≥ 20). According to the results of the BDDQ-AS, 7 more patients were considered to meet the diagnostic criteria for BDD suggesting a total prevalence of 9 patients (25%). BDD Y-BOCS scores were significantly higher among patients scoring positive on the BDDQ-AS, with a mean score of 7.69 (range 0 – 16) in the BDD negative group and 15,75 (range 9 – 24) in the suggested BDD group. This is a significant difference ($p < 0.05$). Distribution of BDD symptoms within the investigated demographic factors are shown in table 4.5. Mann-Whitney U tests showed no significant differences in patient demographics between patients with or without BDD symptoms.

Table 4.5. Distribution of BDD within demographic factors

	BDD symptoms n (%)	No BDD symptoms n (%)	p, (z)*
Gender			0,410 (-0,823)
Male	2 (22)	3 (11)	
Female	7 (78)	24 (89)	
Age			0,057 (-1,905)
Mean (min-max)	61 (51-70)	55 (25-74)	
Std Deviation	5.2	10.9	
Marital status			0,481 (-0,705)
Single	3 (33)	1 (4)	
living together	0 (0)	6 (22)	
Married	4 (44)	16 (60)	
Divorced	1 (11)	2 (7)	
Widow(er)	1 (11)	2 (7)	
Psychiatric disorder			0,425 (-0,798)
Yes	1 (11)	1 (4)	
No	8 (89)	26 (96)	
Previous cosmetic surgery			0,062 (-1,867)
yes	3 (33)	2 (7)	
No	6 (67)	24 (89)	
Unknown	0 (0)	1 (4)	
Previous eyelid surgery			0,244 (-1,164)
Yes	2 (22)	2 (7)	
No	7 (78)	24 (89)	
Unknown	0 (0)	1 (4)	
Reason for surgery			0,209 (-1,257)
Purely cosmetic	1 (11)	8 (29)	
Mostly cosmetic	2 (22)	4 (15)	
Both cosmetic and functional	4 (45)	10 (37)	
Mostly functional	1 (11)	3 (11)	
Purely functional	0 (0)	1 (4)	
Unknown	1 (11)	1 (4)	

* Mann-Whitney U test

Correlations

Preoperative

Before surgery, we found a moderate negative correlation between severity of BDD symptoms as measured by both the BDDQ-AS as well as the BDD Y-BOCS and patient

satisfaction with their eyelids as measured by the BOE (r = -0.431, p < 0.05 and r = -0.528, p < 0.01 respectively). This indicates a poorer patient satisfaction with increasing symptoms of BDD. Furthermore we found a strong positive correlation between the BDDQ-AS and BDD Y-BOCS scores and DAS59 scores (r = 0.654, p < 0.01 and r = 0.693 p < 0.01 respectively). This suggests that patients with more signs of BDD experience more psychological distress associated with self-consciousness of appearance. Last we found a moderate positive correlation between both BDD scales and disability measured by the SDS, indicating more disability in daily life in patients with more signs of BDD (r = 0.514, p < 0.01 and r = 0.424, p < 0.05 respectively).

Table 4.6 Correlations preoperative

Preoperative		BDDQ-AS	BDD Y-BOCS	BOE	DAS59	SDS
Body Dysmorphic Disorder Questionnaire - Aesthetic Version	Pearson Correlation	1	0,747	-,431	0,693	0,514
	Sig. (2-tailed)		<0,01	<0,05	<0,01	<0,01
Body Dysmorphic Disorder Yale-Brown Obsessive Compulsive Scale	Pearson Correlation	,747	1	-,528	,654	,424
	Sig. (2-tailed)	<0,01		<0,01	<0,01	<0,05
Blepharoplasty Outcome Evaluation	Pearson Correlation	-,431	-,528	1	-,465	-,226
	Sig. (2-tailed)	<0,05	<0,01		<0,01	,214
Derriford Appearance Scale 59	Pearson Correlation	,693	,654	-,465	1	,458
	Sig. (2-tailed)	<0,01	<0,01	<0,01		<0,01
Sheehan Disability Scales	Pearson Correlation	,514	,424	-,226	,458	1
	Sig. (2-tailed)	<0,01	<0,05	,214	<0,01	

Postoperative

Three to six months after the surgery, preoperative symptoms of BDD measured by the BDD Y-BOCS and BDDQ-AS scores were also found to be inversely correlated with postoperative BOE scores, suggesting a lower satisfaction with surgery outcome in patients with more signs of BDD. There was a moderate negative correlation of the BOE scores with the BDD Y-BOCS of r = -0.588 (p < 0.01). A strong positive correlation was found between BDDQ-AS and postoperative DAS59 scores of r = 0.611 (p < 0.01). A moderate positive correlation was found between BDD Y-BOCS scores and postoperative DAS59 scores of r =0.479 (p < 0.01). This indicates that psychological distress associated with self-consciousness of appearance is still lower postoperatively in patients with more signs of BDD. Both BDD scales are also moderately correlated with postoperative SDS scores (r=0.400, p <0.05 and r = 0.419, p < 0.05), meaning a higher amount of disability in daily life after the surgery in patients with more signs of BDD. We did not find a correlation between both BDD scores and GBI scores, indicating no difference in post-operative benefit.

Table 4.7 Correlations postoperative

Postoperative		BDDQ-AS	BDD Y-BOCS	BOE	DAS59	SDS	GBI
Body Dysmorphic Disorder Questionnaire - Aesthetic Version	Pearson Correlation	1	,747	-,331	,611	,400	,170
	Sig. (2-tailed)		<0,01	,056	<0,01	<0,05	,388
Body Dysmorphic Disorder Yale-Brown Obsessive Compulsive Scale	Pearson Correlation	,747	1	-,588	,479	,419	-,105
	Sig. (2-tailed)	<0,01		<0,01	<0,01	<0,05	,611
Blepharoplasty Outcome Evaluation	Pearson Correlation	-,331	-,588	1	-,448	-,259	,557
	Sig. (2-tailed)	,056	<0,01		<0,01	,167	<0,01
Derriford Appearance Scale 59	Pearson Correlation	,611	,479	-,448	1	,031	,169
	Sig. (2-tailed)	<0,01	<0,01	<0,01		,869	,380
Sheehan Disability Scales	Pearson Correlation	,400	,419	-,259	,031	1	,195
	Sig. (2-tailed)	<0,05	<0,05	,167	,869		,350
Glasgow Benefit Inventory	Pearson Correlation	,170	-,105	,557	,169	,195	1
	Sig. (2-tailed)	,388	,611	<0,01	,380	,350	

Improvement

Mann-Whitney U tests were used to measure differences in scale outcomes between the patients with and without BDD symptoms. Patients with BDD symptoms scored significantly lower on the BOE prior to surgery ($p < 0.01$).

Postoperatively however, there was no significant difference between BOE scores in patients with or without BDD symptoms ($p = 0.12$). Similar results were found when comparing scores on the DAS59. Patients with BDD symptoms scored preoperatively significantly poorer than patients without BDD symptoms ($p < 0.01$). After the surgery, we did not find a significant difference between these groups ($p = 0.27$) suggesting similar self-consciousness of appearance among both groups.

When looking at disability, patients with BDD symptoms scored preoperatively higher on the SDS than patients without BDD ($p < 0.05$). Postoperatively this difference even increased ($p < 0.01$). This indicates significantly more disability in the BDD group compared to the non-BDD group. Scores of the Glasgow benefit inventory were not significantly different between the BDD group and the non-BDD group ($p = 0.058$). See also Table 4.8.

Table 4.8 Difference of pre- and postoperative patient reported outcome scores in BDD and non-BDD groups

	BDD symptoms n=9 (mean)	No BDD symptoms n=27 (mean)	p-value	Z*
BOE preoperative	17	30	<0,01	-2,721
BOE postoperative	65	76	0,121	-1,551
DAS 59 preoperative	92	55	<0,01	-2,649
DAS 59 postoperative	67	46	0,271	-1,100
SDS preoperative	7	2	<0,05	-2,352
SDS postoperative	12	2	<0,01	-3,142
GBI postoperative	15	10	0,058	-1,895

*Mann-Whitney U tests

DISCUSSION

Our patient group consists of 86% females. This percentage is in accordance with the 2016 statistics of the American society of plastic surgeons. They describe a total of 209.020 blepharoplasties performed in 2016, of which 178.062 on female patients (85%). Ninety-four percent of the patients were over 40 years old.[20] This suggests that our study has a representative sample of blepharoplasty patients.

The results of the BDDQ-AS in this prospective study indicate a 25% prevalence of patients with BDD symptoms seeking blepharoplasty, which is reasonably high. In a study by Veale et al. in 2003 on patients seeking rhinoplasty, 20,7% had suspected BDD using similar BDD scoring instruments. [2] The study of Picavet et al. showed an even higher prevalence of 33% in patients seeking cosmetic rhinoplasty using the BDDQ-AS.[1] In general, these rhinoplasty patients are typically 20 years younger than blepharoplasty patients with a higher chance of manifestation of BDD in this younger population seeking mostly cosmetic improvement, rather than in blepharoplasty patients who are seeking mostly functional improvement. However, according to our results on the BDDQ-AS, with a prevalence of 25% BDD, patients seeking blepharoplasty do not seem to differ from this group. A possible explanation might be that it is not the type of surgery that counts, but the cosmetic/functional reason for surgery, like Picavet et al. described. They found a significant difference in reason for surgery between their BDD and non-BDD group. Patients with more symptoms of BDD had mostly cosmetic reasons, patients with less symptoms of BDD had mostly functional reasons.[1] However, we did not find such a difference in reason for surgery in our study group. In the general population, BDD occurs in about 1-5%, determined by an interview. [21] The 25% BDD prevalence measured by the BDDQ-AS in this study could be an overestimation when taking the following into consideration. Dey et al. compared the prevalence of BDD in patients seeking facial cosmetic and reconstructive surgery using the BDDQ and

the criterion-standard BDD structured clinical interview for DSM-IV (BDD-SCID). The prevalence of BDD in cosmetic surgery patients was 19,7% using the BDDQ. However, after BDD-SCID, only 13.1% actually screened positive for BDD. Similarly, a study by Joseph et al. describes a BDD prevalence of 9.9% in facial cosmetic surgery patients in general, when 13.1% scored positive on the BDDQ.[22] This suggests that only 65-75% of patients scoring positive for BDD symptoms on the BDDQ, actually has BDD.[23] In our study, this would mean that a lower percentage of the patients with a positive screening, would actually be diagnosed with BDD following a psychiatric interview.

This suggestion is furthermore solidified by our results on the BDD Y-BOCS. These results only confirmed the presence of BDD symptoms in two of the nine patients (5.5%). The other seven 'positive' patients did score significantly higher on the BDD Y-BOCS compared to the rest of the study group, but did not meet the criteria for BDD. In our opinion, these arguments strongly suggest an overestimation of the prevalence of BDD in our group when the BDDQ-AS is used.

The two BDD positive patients according to the BDD Y-BOCS were patients without a history of a psychiatric disorder and did not show differences in demographic characteristics in comparison to patients without BDD symptoms.

An interesting finding in our study is the difference in pre- and postoperative patient satisfaction and psychological distress associated with self-consciousness of appearance. Both groups showed significant improvement after the procedure. Patients scoring positive for BDD symptoms, scored significantly worse on these scales preoperatively, but postoperatively they showed no difference from patients without BDD symptoms. This finding suggests that patients with BDD symptoms suffer more from their deviation, but they can benefit as much or even more from the surgery as patients without BDD symptoms. This is in contrast to results of previous studies on rhinoplasty patients.[11,21] This assumption is supported by another finding in the study. We did not find a significant difference in benefit from the surgery between patients with and without BDD symptoms on the GBI scores. This suggest that postoperatively, a blepharoplasty seems equally beneficial in patients with and without BDD symptoms and satisfaction with the result does not differ between the groups. However, this conclusion might be premature. When looking at the Sheehan disability scale, BDD positive patients scored significantly worse than patients without BDD symptoms both pre- and postoperatively. They remain to experience more disability from their symptoms in work, social life and family life. Although they seem to experience the same benefit from the outcome of surgery, they do not express the same improvement socially. The studies by Crerand et al. suggest similar results.[24] They studied patients with BDD that received surgery or minimal invasive procedures and measured appearance and preoccupation with the treated body part, as well as overall BDD symptoms postoperatively. Although appearance and preoccupation with the treated body part improved in respectively 33% and 25% of the patients, overall BDD symptoms improved in only 2,3% of the patients. This study

confirmed the conclusion they drew earlier in 2005, that surgical or dermatological treatment rarely improves the overall severity of BDD.[25] Another possible explanation might be that the postoperative measurement is relatively short after surgery. In cosmetic rhinoplasty patients, euphoric reactions with a general increase in social interactions during the first few months after surgery have been described in the distant past, but 50 years later, Ercolani et al. described a stable psychological improvement up until five years after surgery.[26,27] A third explanation is described by Veale et al. in 2002. This study, concerning BDD in rhinoplasty patients, describes BDD patients as "more likely to believe that dramatic changes would occur in their life after a rhinoplasty".[2] Patients with BDD are expecting secondary gain from their surgery, for example a (better) job or a relation. It is understandable that patients with these unrealistic expectations are more likely to be dissatisfied with the outcome in daily life. The question of many surgeons will be, 'is BDD a contra-indication for cosmetic surgery?'. Although a lot of suggestions have been made in the past, it is not clear. [1,9,12] A critical review by Bowyer et al. states rightly; "based on the current literature, it cannot be fully ruled out that certain individuals with mild BDD and localised appearance concerns may benefit from these interventions".[28] The outcome of this prospective study is an endorsement of this statement and could possibly suggest a modification in the rejection of BDD patients by the cosmetic clinic for this specific intervention.

CONCLUSION

In a blepharoplasty patients group, 25% screened positive on a validated screening tool for BDD, the BDDQ-AS. Based on the current literature concerning this questionnaire, we believe this to be an overestimation. The results of the BDD Y-BOCS seem to give a more accurate display of the presence of BDD in a cosmetic surgery patient group and we therefore recommend the use of this instrument over the BDDQ-AS.

The prevalence of BDD symptoms found in this study are comparable to the prevalence in a rhinoplasty population.[1,2] This finding contradicts our hypothesis that BDD characteristics of patients requesting blepharoplasty differ from patients requesting rhinoplasty. Surprisingly, patients who score positive for BDD can benefit as much as patients without signs of BDD from blepharoplasty in terms of satisfaction and self-consciousness of appearance. Notwithstanding, patients with BDD symptoms keep experiencing more disability in daily life after surgery. These surprising results encourage us to take a closer look at blepharoplasty patients and should motivate the surgeon to being alert on BDD symptoms in this group. However, even with the presence of BDD symptoms, a favourable outcome can be achieved in carefully selected patients.

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5

Predicting unsatisfactory outcome in facial plastic surgery with the RINO: A new assessment on patient characteristics.

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ABSTRACT

Background: Within cosmetic surgery, surgeons make their indications for surgery depending on their intuition of potential benefit and satisfaction of the patient. A previous literature study has identified seven possible negative predictors for satisfaction. An objective tool to measure these seven items is lacking and needed.
Methods: In this pilot study 31 patients who underwent an open (septo)rhinoplasty at the Radboud university medical centre (Radboudumc) in 2016 were asked to preoperatively complete our newly developed questionnaire: the Radboudumc Inventory on Negative Outcome in facial cosmetic surgery (RINO) and the Rhinoplasty Outcome Evaluation (ROE). Three months postoperatively they were asked to complete the ROE and GBI (Glasgow Benefit Inventory) to measure satisfaction and benefit from the surgery. Development of the RINO and assessing its feasibility and internal consistency was our primary goal, some preliminary statistical analyses on the data were performed as well.
Main findings: The RINO had a high response rate of 67%, no questions were skipped and the questionnaire took only 5 minutes to complete. The RINO had a Cronbach's alpha of 0.813, which indicates a good internal consistency.
Conclusions: The RINO proved to be highly feasible in clinical care, with the short time to completion as its strength in daily practice. The internal consistency is good which indicates reliability of the scale. The RINO has potential to becoming the future objective screening tool to predict a risk on dissatisfaction following facial cosmetic surgery.

INTRODUCTION

Within health care, cosmetic surgery is a peculiar profession, It concerns meticulous surgery and patients with high expectations. Usually in healthcare, doctors treat ill patients to improve their health while cosmetic surgeons operate healthy patients and make them unwell for a while with the intention to improve their happiness. Fortunately, in general most patients benefit from facial cosmetic surgery, and state to have an improved quality of life.[1, 2] However, some patients do not experience this improvement and are unsatisfied with the surgical result, even though the cosmetic result is at least moderate according to current standards. In a recent systematic review we identified 7 possible negative predictors for satisfaction.[3] These negative predictors are male gender, young age, unrealistic expectations concerning the surgical result, unrealistic expectations concerning secondary gain, minimal deformities, narcissistic personality, and obsessive personality. It is noteworthy that a great portion of the reviewed studies draw conclusions based on expert opinions.

With the increasing number of facial cosmetic procedures being performed every year, it is highly important to pursue satisfaction in every patient following cosmetic surgery.[4, 5] This development has increased the need for a screening tool that can 'warn' the surgeon for a higher risk on patient dissatisfaction. As a surgeon, it is important to know when not to operate on a patient or to reduce the risk on dissatisfaction by managing unrealistic expectations. Developing a questionnaire for this problem is the first step to objectify this process and may play an important role in the decision-making process for both patient and surgeon.

This study introduces the Radboudumc Inventory on Negative Outcome in facial cosmetic surgery (RINO). The RINO is a new composed questionnaire that has been developed to address the previously mentioned negative predictors in order to screen for patients that may be dissatisfied after cosmetic surgery. It is hypothesized that this questionnaire is a feasible and reliable screening tool This study is a pilot study which is, after a systematic review, the second step in the process of developing and validating the questionnaire.[6] If this questionnaire proves to be a valid screening tool for the before mentioned specific negative predictors, the surgeon has the means to estimate a risk on dissatisfaction based on facts instead of his intuition. With approximately 730,000 rhinoplasties performed worldwide in 2015 and nearly 4 million facial cosmetic procedures in total (estimation by the International Society of Aesthetic Plastic Surgery), it is important to prevent or reduce postoperative dissatisfaction.[4]

The primary outcome measures in this study are the feasibility and internal consistency of the questionnaire as a value of reliability. The questionnaire is developed to be useful in all facial cosmetic surgery patients, however, in this pilot study we used a group of rhinoplasty patients. We furthermore present some preliminary results.

METHODS

Patients and materials

We conducted a pilot study on 31 patients at the Radboud university medical center. All patients who underwent an open (septo)rhinoplasty in 2016 and were above 18 years old were requested to participate in this study. Patients who requested rhinoplasty because of a deformity due to a cleft lip were excluded from the study. The indication for (septo)rhinoplasty was a combination of functional and cosmetic complaints in all patients. Patients who were not able to complete a Dutch questionnaire were excluded from the study.

A new questionnaire was developed: the RINO. The RINO consists of a patient survey and a short survey to be completed by the surgeon prior to performing the surgery. The composition of the surveys is further discussed below. The goal of this study is to evaluate the RINO on feasibility and internal consistency. The RINO was used pre-operatively to assess the patient characteristics of interest. Patient satisfaction with the appearance of their nose was pre- and postoperatively measured by the Rhinoplasty Outcome Evaluation (ROE). The Glasgow Benefit Inventory (GBI) postoperatively measured benefit from the surgery. Both the ROE and GBI are validated and reliable instruments, which are already used in practice.[7] These outcome measures are correlated with the patient characteristics measured by the RINO. Specifications of the used questionnaires are set out below. All patient were requested by telephone to participate. The questionnaires were completed online. Patients received no financial compensation for participation in the study.

Development of the RINO

The first step in the development of this new measurement instrument was a systematic review on all negative predictors for satisfaction after cosmetic surgery and the existing instruments intended to measure these patient characteristics. This systematic review eventually indicated 7 negative predictors for satisfaction in facial cosmetic surgery patients. These factors were male gender, young age, unrealistic expectations concerning the surgical results, unrealistic expectations concerning secondary gain, minimal deformity, obsessive personality and narcissistic personality.[3] Second, the construct of who and what to measure should be defined. The target population will be patients seeking facial cosmetic surgery, the purpose of measurement will be to assess these 7 possible negative predictors for outcome in cosmetic surgery. The final goal is to develop a valid and reliable screening tool to predict a risk on poor postoperative satisfaction.

The selection of items that are proposed to use in this screening tool is based on the preceding literature study and the expert opinion of one professor in medical psychology and three certified facial plastic surgeons. Next, we decided for which predictors a multi-item measurement instrument was needed and for which patient characteristics a single-item was sufficient. The RINO contains a total of 38 items and addresses age (1 item), gender (1 item),

former psychological or psychiatric treatment (1 item), unrealistic expectations concerning the surgical result (4 items), unrealistic expectations concerning secondary gain (4 items), minimal deformity (3 items), obsessive personality (8 items) and narcissistic personality (16 items), as shown in Figure 1. Answer options may vary per question. Dichotomous yes or no questions were used to assess unrealistic expectations concerning the surgical result and unrealistic expectations concerning secondary gain. The 3 items for minimal deformity consisted of a VAS scale of 1 to 10 on which the patient respectively grades the appearance of the nose, the expected result and the result hoped for. To measure obsessive personality we used questions based on an existing questionnaire of the Dutch foundation of psychological health to test for symptoms of coercive problems.[8] This survey consists of 8 yes or no questions on whether or not the patient has certain obsessive compulsive thoughts and behaviors. The total score of the obsessive personality subscale ranged from 0 to 8. To screen for a narcissistic personality, the NPI 16 was used.[9] In this questionnaire, patients have to choose in 16 situations, which one of two items applies to them most. Total scores of the narcissistic personality subscale ranged from 0 to 16.

To be able to compare the conception of the patient with the opinion of the surgeon, we developed a brief surgeon questionnaire which consists of 4 questions. One item inquires the surgeons intuition if a patient is going to be hard to please, the second question asks the surgeon to grade the appearance of the patients' nose on a scale of 1 to 10. In the next question the same 0 to 10 scale is used to ask the surgeons to predict the achievable result of the surgery. The last item asks the surgeon if he is willing to operate on the patient.

Rhinoplasty Outcome Evaluation

The ROE is used in this study to measure satisfaction of the nose both prior to as well as after the surgery. The ROE is a short questionnaire designed by Alsarraf et al[10]. This questionnaire has been designed specifically for patients who undergo a rhinoplasty and is put together with six items of functional, aesthetic, and social aspects of the nose, scored by the patient itself. The items are scored on a 5-point Likert scale in which 0 represents the worst outcome and 4 represents the best outcome. To calculate the scaled score of the ROE, the cumulative score is divided by 24 and multiplied by 100. The range is then 0-100, with a higher score representing a higher patient satisfaction. The ROE has already been used in several studies and has proved to be valid and useful[1,11]. It was translated using the rules of forward-backward translation[12].

Glasgow Benefit Inventory

The GBI is a questionnaire intended to use following intervention to assess patient benefit from an intervention. The GBI is developed by Robinson et al. in 1996 in particular for otolaryngological interventions. It measures the change in health status as a result of a certain intervention[13].

The GBI consists of 18 questions based on a 5-point Likert scale. To minimize response bias, half of the questions were reversed. The GBI has a total score and three subscale scores: general perception of well-being including psychological health benefit, social support benefit, and physical health benefit. The total scores range from -100 (maximal negative benefit) to 0 (no benefit) to +100 (maximal benefit).

Participants completed the RINO and the ROE before the operation. Three months after the surgery, they completed the ROE and the GBI.

Data analysis

Questionnaires were completed online using CastorEDC (Ciwit, 2011). Statistical analyses were performed using the software program SPSS, version 22 (SPSS inc., 2002).
The collected data were checked for normality using Kolmogorov-Smirnov. As expected, not all data proved to be normally distributed. The pre- and post-operative ROE scores and the GBI scores were normally distributed as well as the scores on the narcissistic subscale, so parametric tests were used for analyses of these data. The scores on the other subscales of the RINO were not normally distributed and were therefore analysed with nonparametric tests. Pre- and postoperative ROE scores were compared to measure actual patient satisfaction. In addition, benefit from the surgery was measured with the GBI. Patient characteristics were furthermore compared between men and women. The achieved result graded by the surgeon and the post-operative satisfaction by the patient were analysed and compared. p-values of <0.05 were considered significant.
Feasibility of the RINO was evaluated and included the response rate, completeness of the answers on the questionnaire and time to completion. As the patients in this pilot study completed the questionnaire online, the required time to complete the questionnaire could not be measured precisely. To achieve a realistic estimation of the actual time to complete the questionnaire, several researchers volunteered to complete the questionnaire while time was measured. Internal consistency was analysed as a measure of reliability of the scale. This indicates if a scale has no random error. Cronbach's coefficient alpha provides an indication of the average correlation among all of the items of the scale. A value of 0.7 is generally considered acceptable, but values above 0.8 are preferable.

RESULTS

Demographics

Thirty-one patients agreed to participate in this pilot. Twelve patients did not complete one or both surveys and were excluded from the study. Nineteen patients completed all questionnaires. Their mean age was 34 years (range 18-58) and 4 (20%) were males. The

excluded patients had a mean age of 28 years (range 17-39) and 3 (27%) were males. The indication for surgery was comparable in both groups. Only a few outliers were found: 3 outliers in the total score of the obsessive personality subscale and 1 outlier in a demographic question of the RINO. It was chosen to keep these results in the analysis, since the tests had an explorative character and the results were not significantly different when they were excluded.

Tabel 5.1. Demographics

	Male (n=4)	Female (n=15)
Age, years, mean (range)	34 (22-56)	34 (18-58)
Previous nose surgery, n (%)	1 (25%)	4 (27%)
Preoperative grade nose, mean (range)	5.25 (4-6)	4 (1-6)
Expected result grade nose, mean (range)	7.75 (7-9)	8.00 (6-10)
Psychiatric or psychological history n (%)	1 (25%)	5 (33%)

Feasibility

From the 31 eligible patients who were asked to participate, no one explicitly refused to participate. Twenty-one patients completed the RINO, which is a response rate of 68%. Nineteen patients (61%) completed both pre- and postoperative questionnaires. One patient completed only the ROE postoperatively, not the GBI. Two patients completed the pre-operative questionnaire, but failed to complete the post-operative questionnaire. Since these two patients were unreachable thereafter, their reasons for not completing the questionnaires remains unknown and they were lost to follow-up. The time to completion required approximately 5 minutes. There were no missing values in the completed questionnaires, all questions were completed.

Reliability

The internal consistency of the RINO was analysed using Cronbach's alpha. Age and gender were not included in this measurement because demographic data is not expected to be consistent with the rest of the questionnaire. Also, the optional follow-up questions (B2, B8 and B10) were excluded because they were only completed by some patients. Three questions showed (almost) no variance and were removed from the scale (B3, D4 and D13). (See also figure 1) The RINO has a Cronbach's alpha of 0.813, which indicates a good internal consistency of this questionnaire. The NPI-16 subscale alone has a Cronbach's alpha of 0.599 in this sample. In table 2, item total statistics of the RINO are displayed. In the

last column, the impact of removing each item from the scale is given. No items would significantly improve the Cronbach's alpha by removing them from the scale.

Table 5.2. Item-total statistics

Question	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Cronbach's alpha if item deleted
A5	59,07	37,210	,223	,811
B1	58,47	35,552	,713	,798
B4	58,93	36,924	,241	,811
B5	59,20	39,171	-,143	,820
B6	58,87	37,124	,203	,812
B7	59,20	37,029	,354	,808
B9	56,07	27,067	,670	,793
B11	51,80	33,171	,358	,812
B12	52,20	30,457	,661	,788
B13	58,60	36,114	,426	,804
C1	58,40	36,257	,753	,801
C3	58,53	36,124	,476	,803
C5	58,40	36,257	,753	,801
C6	58,40	36,257	,753	,801
C7	58,40	36,257	,753	,801
C8	59,07	37,210	,223	,811
D1	58,47	35,552	,713	,798
D2	58,93	36,924	,241	,811
D3	59,20	39,171	-,143	,820
D5	58,87	37,124	,203	,812
D6	59,20	37,029	,354	,808
D7	56,07	27,067	,670	,793
D8	51,80	33,171	,358	,812
D9	52,20	30,457	,661	,788
D10	58,60	36,114	,426	,804
D11	58,40	36,257	,753	,801
D12	58,53	36,124	,476	,803
D14	58,40	36,257	,753	,801
D15	58,40	36,257	,753	,801
D16	58,40	36,257	,753	,801

ROE scores

The study group showed a mean preoperative ROE score of 32 points. This score increased with 30 points to 62 postoperatively. This is an improvement above the established clinically relevant improvement of 25 points. This increase was statistically significant (p=0.048). There were no outliers in the ROE scores. No extraordinary post-operative course has been described in the follow up of these patients.

GBI scores

The range on the GBI in our study group measured from -6 to 50. The mean score was 15.79, indicating that patients experienced benefit from the surgery in daily life. No significant difference was found in GBI scores between men and women p=0.235.

Grading of the nose

A Wilcoxon Signed Rank test revealed a statistically significant difference between the preoperative grading of the nose by the patient and the grade by the surgeon. Patients graded their nose significantly poorer than the surgeon (z = -3,095, p < 0,01). When looking at the expected result, this difference was not retrievable. Patients and surgeons expected to achieve similar results (z = -1,165, p = 0,244).

Satisfaction

Patients satisfaction with their nose was measured by difference on the ROE scores and benefit on the GBI scores. Surgeons also evaluated the postoperative results and graded the appearance of the patients' nose on a scale of 1 to 10 again. These grades were compared to the improvement in satisfaction and to benefit in daily life to assess whether or not patient satisfaction matched the opinion of the surgeon. There was a significant correlation between the postoperative opinion of the surgeon and both the improvement in satisfaction as well as postoperative benefit. (Table 3) There was no correlation found between the expectation by the surgeon that a patient would be hard to please and the actual satisfaction by the patient postoperatively on the ROE (p = 0,284). No significant correlations were found between the 7 factors of the RINO separately and postoperative outcome measured by the BOE and GBI.

Table 5.3. Correlation between opinion of the surgeon and patient satisfaction.

		Grade result surgeon	ROE improvement	GBI benefit score
Grade result surgeon	Pearson Correlation	1	0,482	0,571
	Sig. (2-tailed)		<0,05	<0,05
	N	19	19	19
ROE improvement	Pearson Correlation	0,482	1	0,693
	Sig. (2-tailed)	<0,05		<0,01
	N	19	19	19
GBI benefit score	Pearson Correlation	,571	,693	1
	Sig. (2-tailed)	<0,05	<0,01	
	N	19	19	19

DISCUSSION

In this pilot study we propose an instrument that tries to predict unsatisfactory outcome in facial cosmetic surgery. We developed the Radboudumc Inventory on Negative Outcome in facial cosmetic surgery and studied its feasibility and reliability.

The results showed that the RINO is a feasible questionnaire: no questions were skipped, the response rate of 67% was satisfactory, and it took little time to complete. We believe that the short length in combination with the diversity of the items is the strength of this inventory. The RINO also showed a good internal consistency with a Cronbach's alpha of 0.813. This suggests reliability of the scale and is a very promising outcome in such a small sample. A future study with a larger sample is needed to further prove the reliability and validity of this inventory. Future studies should also be conducted to measure the influence of each of the seven factors on postoperative satisfaction. In this pilot, we did not find a significant correlation between the seven RINO factors and outcome by the ROE and GBI. It is hypothesized however, that the combination of the factors could have a significant effect on outcome. When this is recognized, importance of each factor can be established and a score per variable can be assigned to be able to measure a total RINO score that points out the degree of the risk. An interesting preliminary finding is the significant difference between the preoperative grading of the nose by the patient and the surgeon. Patients graded their nose poorer than the surgeon did, suggesting a more critical appraisal of their own nose. The expected result however, did not differ between surgeons and patients, suggesting that patients expected a greater improvement of the nose. Since satisfaction and benefit significantly improved after surgery, it seems that the expectations of the patients were met by the surgery. This correlated with the postoperative grading of the surgeon. Within these preliminary results, we could

thus not find any signs that certain (unrealistic) expectations were present in our patients that were not met by the surgery. No correlation was found between the intuition of the surgeon and patient satisfaction, indicating that the gut feeling of the surgeon has not been proved to be reliable. We did not find any correlations yet between the seven factors, patient satisfaction and benefit. Because the study is conducted on a small sample, which is inherent to a pilot study, this was to be expected.

The Cronbach's alpha of the NPI-16 in this study is lower than the Cronbach's alpha in the NPI-16 validation study by Ames et al (0.60 vs 0.70). Their article describes 5 studies they performed to validate the NPI-16.[9] A possible explanation for this difference may be that these validation studies used a larger sample size.

In this field of interest, much knowledge is based on expert opinions. The preceding literature study reviewed articles concerning this subject up to 1960, many of which are based on expert opinions.[3] This illustrates the need for more objective measures, which we hope to provide in future studies with the RINO.

CONCLUSION

The main goal of this study was to validate the RINO based on feasibility and reliability. Based on the results reported in this study, we conclude that the RINO is a highly feasible questionnaire with good internal consistency. It takes little time to complete, few questions are skipped and it is easy to complete. This makes the RINO an interesting instrument to implement in the clinical practice.

In addition to its feasibility and reliability, we see the RINO in the future as a good instrument to translate the unreliable intuition of the surgeon into quantitative data, and thus preventing or reducing patient dissatisfaction in an objective manner. With the ever increasing amount of facial cosmetic surgical procedures performed each year, both patients and surgeons should be as satisfied as possible. The RINO could lead us in that direction.

RINO

Radboudumc Inventory on Negative Outcome in facial cosmetic surgery.

A. Demografics

1. Date of birth: __/__/____ (DD/MM/YYYY)

2. Gender: ☐ Male ☐ Female

3. Marital status:

☐ Single ☐ Together ☐ Married ☐ Divorced ☐ Widow(er)

4. Date: __/__/____ (DD/MM/YYYY)

5. Have you ever been treated by a psychologist or psychiatrist?

☐ Yes ☐ No

B. Expectations regarding the procedure

1. Have you had previous cosmetic facial surgery in which the shape of your nose was changed?

☐ Yes ☐ No

2. If so, how satisfied were you with the result?

(0 being the most unsatisfied that you can think of and 10 being the most satisfied)

0 1 2 3 4 5 6 7 8 9 10

3. Do you have a picture of your perfect nose in your head? ☐ Yes ☐ No

4. If so, do you think this picture is a realistic result? ☐ Yes ☐ No

5. Is your partner supportive of the surgery? ☐ Yes ☐ No

6. Is your family supportive of the surgery? ☐ Yes ☐ No

7. Do you hope the surgery will change anything in your daily life? ☐ Yes ☐ No

8. If so, which things?

.....

9. Do you have any goals in life you would like to achieve as a result of the surgery?

☐ Yes ☐ No

10. If so, which things?

.....

.....

.....

11. Give your nose a score between 0 and 10

(0 being the most ugly nose you can think of and 10 being the most beautiful nose)

0 1 2 3 4 5 6 7 8 9 10

12. Which score do you hope to achieve after the surgery?

0 1 2 3 4 5 6 7 8 9 10

13. Which score do you think to achieve after the surgery?

0 1 2 3 4 5 6 7 8 9 10

C. Characteristics

1. Do you have repetitive mental activities (thoughts, tendencies, images) that you consider to be imposed, misplaced, or uncomfortable , like:

- Fear of contamination and germs.
- Aggressive, sexual of religious thoughts that you disapprove of yourself.
- The urge to keep your belongings in perfect order.
- Thoughts or images of terrible accidents or other bad events

☐ Yes ☐ No

2. Do you try to ignore these mental activities, to suppress them or to reduce them with other thoughts or actions? (if you answered 'no' on the previous question, choose 'no' again)

☐ Yes ☐ No

3. Do you perform compulsive rituals because you inexplicably feel like you have to?

For instance:

- Counting objects
- Checking things (e.g., locks on doors)
- Ordering items in a certain way
- Excessive cleaning
- Repeating actions (e.g., turning on and off switches)
- Repeating words

☐ Yes ☐ No

4. Do you feel like something bad will happen if you don't perform these compulsive rituals? (if you answered 'no' on the previous question, choose 'no' again)

☐ Yes ☐ No

5. Do you suffer from the mental activities (described in question 1) and/or the compulsive rituals (described in question 3) (if you answered 'no' on question 1 and 3, choose 'no' again)

☐ Yes ☐ No

6. Do you find it difficult to control these mental activities or compulsive rituals?
(if you answered 'no' on question 1 and 3, choose 'no' again)

☐ Yes ☐ No

7. Do you spent more than an hour a day on these mental activities or compulsive rituals?
(if you answered 'no' on question 1 and 3, choose 'no' again)

☐ Yes ☐ No

8. Are these mental activities or compulsive rituals causing serious problems in your daily routine, study, job or social life?
(if you answered 'no' on question 1 and 3, choose 'no' again)

☐ Yes ☐ No

D. Personality

Read each pair of statements below and place an "X" by the one that comes closest to describing your feelings and beliefs about yourself. You may feel that neither statement describes you well, but pick the one that comes closest. Please complete all pairs**.**

1. ___ I really like to be the center of attention
   ___ It makes me uncomfortable to be the center of attention

2. ___ I am no better or no worse than most people
   ___ I think I am a special person

3. ___ Everybody likes to hear my stories
   ___ Sometimes I tell good stories

4. ___ I usually get the respect that I deserve
   ___ I insist upon getting the respect that is due me

5. ___ I don't mind following orders
   ___ I like having authority over people

6. ___ I am going to be a great person
   ___ I hope I am going to be successful

7. ___ People sometimes believe what I tell them
___ I can make anybody believe anything I want them to

8. ___ I expect a great deal from other people
___ I like to do things for other people

9. ___ I like to be the center of attention
___ I prefer to blend in with the crowd

10. ___ I am much like everybody else
___ I am an extraordinary person

11. ___ I always know what I am doing
___ Sometimes I am not sure of what I am doing

12. ___ I don't like it when I find myself manipulating people
___ I find it easy to manipulate people

13. ___ Being an authority doesn't mean that much to me
___ People always seem to recognize my authority

14. ___ I know that I am good because everybody keeps telling me so
___ When people compliment me I sometimes get embarrassed

15. ___ I try not to be a show off
___ I am apt to show off if I get the chance

16. ___ I am more capable than other people
___ There is a lot that I can learn from other people

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6 General discussion and conclusions

GENERAL DISCUSSION

The aim of this thesis was to describe the relationship between psychological aspects and patient reported outcome in facial cosmetic surgery. Although we have come a long way since the beginning of the specialty, plastic surgery and, in particular, aesthetic surgery is still closely associated with psychological health. The studies compiling this thesis are not just focused on the identification and presence of psychological features in facial plastic surgery patients, but even more on the influence of these features on the outcome of surgery, and vice versa.

In **Chapter 2**, we aimed to describe personality characteristics that are associated with deteriorated satisfaction after facial cosmetic surgery. An extensive literature study indicated seven possible psychosocial aspects with a negative influence on postoperative satisfaction.[1] These aspects are: 'male gender', 'young age', 'unrealistic expectations concerning the surgical result', 'unrealistic expectations concerning secondary gain', 'minimal deformities', 'narcissistic personality', and 'obsessive personality'. We were surprised that almost all the articles on this subject were quite outdated and many aspects were based on expert opinions. If we consider the nature of the negative predictors that we found, besides the demographic characteristic of gender and age, all the aspects can be related to expectation in a certain way. Unrealistic expectations concerning the result of surgery or the result in daily life do not need further clarification on that point. Those factors are by far the most often described predictors of dissatisfaction postoperatively.[2-11] Minimal deformities refer to patients seeking cosmetic correction of a flaw that is barely visible to others. People tend to be more critical and unsatisfied about their own body than others.[12] It could be argued that patients seeking painful surgery for minimal deformities expect perfection, also from their body. The problem is that the minor new flaws postoperatively, for instance caused by scarification, may very likely cause as much dissatisfaction as the first. A definition of narcissism is an inflated self-image and addiction to fantasy, by an unusual coolness and composure shaken only when the narcissistic confidence is threatened, and by the tendency to take others for granted or to exploit them. The disorder is named for the mythological figure Narcissus, who fell in love with his own reflection.[13] According to the DSM-V criteria for narcissistic personality disorder, "goal-setting is based on gaining approval from others; *personal standards are unreasonably high in order to see oneself as exceptional*, often unaware of own motivations".[14] Because of these unreasonable high standards, it is not unthinkable that patients with signs of a narcissistic personality overestimate the possible result of an aesthetic procedure. The other personality trait that we described in **chapter 2** is an obsessive personality. These patients show signs or symptoms matching obsessive-compulsive personality disorder (OCD). A typical characteristic described in the DSM-V of OCD is: "Rigid insistence on *everything being flawless, perfect, without errors or faults, including one's own* and others' performance;

sacrificing of timeliness to ensure correctness in every detail; believing that there is only one right way to do things; difficulty changing ideas and/or viewpoint; preoccupation with details, organization, and order."[14] In our opinion, it seems unambiguous why patients with such a personality expect only a perfect result and will hardly ever be satisfied. Patients matching one or more of these characteristics are not necessarily unsuitable for aesthetic surgery. The surgeon, however, by recognizing these features, could respond to them adequately to adjust the expectations and thereby prevent an unsatisfactory result. In **Chapter 5**, the aim was to provide a brief tool for surgeons, to determine the abovementioned patient characteristics easily in clinic. This chapter presents a pilot study with a newly developed screening tool for these seven negative predictors. This pilot study is used as a means of measuring feasibility and internal consistency of a newly developed scale, the Radboudumc Inventory on Negative Outcome in facial cosmetic surgery (RINO).

Chapter 3 describes a prospective study that addresses our aim to assess the influence of a decreased self-consciousness of appearance on the outcome of surgery in rhinoplasty patients. Satisfaction with, and benefit from the surgery were measured by the Rhinoplasty Outcome Evaluation (ROE). Pre- and postoperative self-consciousness of appearance was measured by the Derriford Appearance Scale (DAS59). One of the conclusions of this study was that patients seeking rhinoplasty suffer from a higher level of psychological distress from a lower self-consciousness of appearance. Fifty years ago, this distress was explained as projections of inner conflicts and patients were send to a psychiatrist rather than a cosmetic surgeon.[15] Our study showed that poor self-consciousness of appearance before surgery, did not seem to have a negative influence on the satisfaction afterwards. On the contrary, patients who have a lower self-consciousness of appearance before the operation, benefit even more from a well-executed procedure. To refer to the previous chapter, an interesting finding in this study was that male patients did not have the same benefit in daily life after surgery as female patients. Because of this significant difference and the fact that it was often described before[2, 3, 5, 9, 16-20], we searched for a logical explanation. As described in the discussion section of **chapter 3**, Rohrich et al. stated that males seeking rhinoplasty have a lower understanding of their deformity. Rohrich also presumes that a man listens selectively and therefore recalls less of the information explained to him about the surgical possibilities during the consultation, which results in a poorer understanding of the potential outcome with a higher chance of dissatisfaction as a result.

Another group of patients we specifically addressed in this thesis were blepharoplasty patients. This is an interesting population for several reasons. Blepharoplasty is a very regularly performed procedure. At least 1.3 million procedures were carried out worldwide in 2016. It is therefore by far the most frequently performed facial cosmetic procedure, almost as often as breast augmentation.[21]

Patients seeking blepharoplasty differ from patients seeking other forms of facial cosmetic surgery. Furthermore, blepharoplasty patients are older than patients seeking other forms of cosmetic surgery. In the USA in 2016, 69.3% of all blepharoplasty patients were over 50 years old. Even 96.8% was over 35 years old. In comparison with, for instance, breast augmentation, 51.5% was over 35 and only 12.5% over 50 years old, and rhinoplasty patients where 44.6% was over 35 and 14.8% was over 50 years old.[22] Despite this somewhat different patient group, not much has been written about blepharoplasty patients in terms of postoperative satisfaction and quality of life (QoL), let alone about Body Dysmorphic Disorder (BDD). Our aim was to describe patient reported outcomes after blepharoplasty. We furthermore aimed to evaluate the prevalence of BDD in this patient group.

In **Chapter 4.1**, we describe a prospective study on blepharoplasty patients and showed that patient satisfaction with their eyelids, as well as self-consciousness is significantly improved by this procedure. Patients also report benefit of the surgery in daily life. Distress related to self-consciousness of appearance was lower in our blepharoplasty group than in our rhinoplasty patients. This indicates at least that blepharoplasty patients are less worried by their deformity in terms of self-esteem. The results of the DAS59 only correlated partly with the outcome scores (BOE and GBI) in blepharoplasty patients. Self-consciousness did not seem to have the same influence on outcome in blepharoplasty patients as it has in rhinoplasty patients.

It is important to measure satisfaction and patient related outcome in cosmetic surgery patients, since the deterioration of the same indicators can be considered as the main reason for surgery. Cosmetic surgeons should be able to measure these indicators both prior to and after surgery, in a brief and easy way. Nowadays, people are flooded by questionnaires and surveys to evaluate every company they come across. Most people disregard most of these survey invitations, especially when they take more than a couple of minutes to complete. The experience gained by this thesis is that without further encouragement, the average respond rate to a survey invitation send by letter post, is 30% or less. If you pursue to measure a representative sample of your patients, you need a brief survey of only a couple of questions that your patients can complete in your office. From this thesis we recommend the use of a brief survey like the Blepharoplasty Outcome Evaluation (BOE) before and after surgery. To know more about the benefit patients experience in their daily lives from the surgery, the Glasgow Benefit Inventory (GBI) seemed to be an appropriate instrument.

In **Chapter 4.2**, the prevalence of BDD was analyzed in the blepharoplasty patient group. In comparison to the before mentioned negative predictors for outcome in cosmetic surgery, BDD is considered by many authors to be a much stronger contraindication for surgery.[23-25] In the general population, BDD occurs in about 1-5%, determined by an interview.[26] The prevalence of BDD in a rhinoplasty patient group has been shown to be 20-30%.[23, 27] The prevalence of BDD in our blepharoplasty patient group was measured by two validated BDD questionnaires, the BDDQ-AS Body Dysmorphic Disorder Questionnaire – Aesthetic

Version (BDDQ-AS) and the Body Dysmorphic Disorder Yale Brown Obsessive Compulsive Scale (BDD Y-BOCS).[28-31] The interesting finding in this study was that the measurement of BDD on both scales did not match at all. 25% of our patients scored positive for BDD on de BDDQ-AS, indicating a similar prevalence of BDD as in a rhinoplasty group. However, only 5.6% also scored positive on the BDD Y-BOCS (5.6%). Strengthened by literature, we concluded that the results of the BDDQ-AS were probably an overestimation.[32] Patients scoring positive for BDD on the BDDQ-AS though, do show some BDD symptoms, and we used these results to assess the outcome of surgery between the BDD negative and BDD positive groups. BDD positive patients scored significantly worse than BDD negative patients on preoperative BOE and DAS59 indicating that they suffer more from their cosmetic deviation. After surgery, however, we measured no difference anymore between BDD positive and BDD negative patients on satisfaction and self-consciousness of appearance. So also in patients with symptoms of BDD, the outcome of a blepharoplasty can be satisfactory and can improve self-consciousness of appearance.

PSYCHOLOGICAL IMPLICATIONS

The psychological implications of a disfigured body part might be underestimated. As described underneath, many studies have been done in the past about the psyche of the patient requesting cosmetic surgery and even more about the outcome of the surgery on psychological aspects. But the reason for the psychological symptoms patients express when they ask for correction must have an origin. As stated above, people are generally more critical about their own appearance then they are about others.[12] On the other hand, facial expression is a huge factor by which one's impression is determined by another individual.[33] The well-known saying: 'Real beauty is on the inside', sounds very comforting and although it might be true, in most encounters, people do not look that far. The study by Bullock that we also addressed in **chapter 4.1**, describes the psychosocial implications of hanging upper eyelids on other people. They showed pre- and postoperative photographs of patients with blepharoptosis and dermatochalasis to 210 individuals who rated the photographs on 11 characteristics: intelligence, threat, friendliness, health, trustworthiness, hard work, mental illness, financial success, attractiveness, alcoholism and happiness. The remarkable results showed that the preoperative pictures were rated significantly worse in comparison with the postoperative ones on all 11 characteristics.[33] Although there is no evidence that facial features correlate with character, apparently people do assess facial features to characterize others. The term 'physiognomy' describes this concept and it has been used for ages. In ancient Greek poetry descriptions are found about the relationship between appearance and character and also in ancient India and China it was used to 'read faces'. It's popularity changed with time, disparaged in the Middle ages but reused by Johann Kaspar Lavater (1741–1801), a Swiss

pastor who wrote several books about it. Later in the 19th and 20th century, physiognomy was used as a scientific basis for racism.[34-36] Several body features have been discredited by stigmatizing them as wrong or undesirable because they would indicate a criminal nature.[37] Apparently, people subconsciously associate a face with blepharoptosis and dermatochalasis with: less intelligent, threatening, less friendly, unhealthy, untrustworthy, less hard working, mentally ill, financially failing, unattractive and unhappy alcoholics.
It obviously goes too far to state the above, but it does give an insight in the way we are viewed and treated by others as a result of our appearance. Social interactions in daily life have a huge impact on our perceived QoL.[38] The reflection of a disfigurement in the facial expression of a stranger is often much worse than in the reflection of the mirror. These mainly non-verbal reactions cause withdrawal from social life and a fear to meeting new people. In this way, a disfigured body part can be the cause of anxiety, depression, body image deterioration and difficulties in personality adjustment.[39]
With this knowledge, we can return to the original question by which we concluded the general introduction of this thesis:

Are patients requesting cosmetic surgery unsatisfied with their body because of a mental disorder, or are they mentally affected by a disfigured body part? And additionally: *Can we treat these psychological symptoms with cosmetic surgery?*

To start with the first question, there is much evidence gathered in this thesis that support the second statement, i.e. people are mentally affected by a disfigured body part instead of being unhappy with their body due to a mental disorder. In **chapter 3**, we concluded that patients who have a higher amount of psychological distress associated with self-consciousness of appearance before rhinoplasty, benefit even more from a well-executed procedure. This suggests a relief of distress symptoms by the surgery. However, we did not measure the appearance related distress again after the surgery, so that keeps some room for discussion. In chapter 4.1, we conducted an extensive prospective study on blepharoplasty patients in which we measured outcomes using more questionnaires, both prior to as well as after the surgery. In this study, we did measure distress associated with self-consciousness of appearance by the DAS59 before as well as after the surgery. The results showed a significant relief of distress. This result is a stronger argument in favor of the statement that patients requesting cosmetic surgery are mentally affected by their disfigured body part. This is furthermore proven by the results of **chapter 4.2**. In this study, even patients scoring positive for BDD show a significant improvement after the procedure. Patients with BDD symptoms scored significantly worse on satisfaction and psychological distress associated with self-consciousness of appearance preoperatively, but postoperatively they showed no difference from patients without BDD symptoms. This suggests that even patients with BDD symptoms do have a relief of psychological symptoms after blepharoplasty. BDD

patients are known for their preoccupation with an imagined or grossly exaggerated defect of appearance.[40] It is possible that patients with an imagined defect will find much less relief of symptoms when operated on, since surgery will most likely not change very much of their appearance. When looking for evidence outside of this thesis, we found a paper from 1973 by Hay et al. in which several psychometric tests are completed by rhinoplasty patients before and after the surgery. Although the terminology is a little outdated, the results are not. All patients improved after surgery in terms of hysteroid obsession, hostility and personal illness. Even patients with minimal disfigurements improved significantly and showed no difference with patients having more marked defects.[41] In 1991, a larger study was conducted by Goin et al. She described a group of rhinoplasty patients and measured psychological changes by the surgery. She found that positive psychological changes occurred after rhinoplasty with regard to self-consciousness, interpersonal sensitivity, self-esteem, anxiety, depression, obsessive-compulsiveness and paranoid ideation.[42] Honigman et al. reviewed the literature on psychological and psychosocial outcomes in patients undergoing cosmetic surgery in general and published the article in 2004. They searched for improvement of psychosocial functioning after surgery as well as for predictors of an unsatisfactory psychological outcome. They included 37 studies in their review. The studies encompassed the outcomes of several cosmetic procedures. Of these 37, 31 studies described some kind of psychological improvement after surgery in the majority of their study group. The psychological improvement was referred to in a wide variety of terms, but included 'improvement in self-esteem/appearance'; 'improved body image'; 'increased social confidence'; 'improved psychosocial functioning'; 'relief of psychological distress'; 'reduction of psychiatric symptom scores'; and a 'decrease in anxiety and neuroticism with increase of extraversion'. This comprehensive list of studies support our theory that psychological complaints can indeed be caused by a disfigured body part. It furthermore seconds our theory that these symptoms can be relieved by cosmetic surgery. It would be beyond reasonable of course, to propagate cosmetic surgery as a treatment for every patient suffering from mental illness and, for instance, a deformed nose. Anxiety, distress and lack of self-esteem can very well be signs of a serious mental illness. As a cosmetic surgeon, care and attention for your patient is therefore essential to be able to make considerate decisions together.

FUTURE PERSPECTIVES

Following the systematic review in **chapter 2** and the pilot study we presented in **chapter 5**, larger studies need to be set up to gain more knowledge about our presumed 7 negative predictors. The questionnaire we developed to measure these factors (RINO) could be a big help in this process. Further studies with larger samples will be conducted to further assess reliability and validity of the RINO. Since much of our knowledge on this subject is

still based on expert opinions, we need an objective assessment of these factors. We hope to provide this assessment tool with the RINO. With this tool, we are able to analyze the personality features of our facial cosmetic surgery patients preoperatively, to assess their actual influence on the outcome of surgery. Following on the general discussion section, postoperative measurements should also take place, to assess change in psychological health as a result of the surgery.

In 2010, a new patient reported outcome (PRO) instrument was introduced and validated by Klassen et al. The FACE-Q is specifically developed for use in patients seeking facial aesthetic procedures. The instrument is very extensive, it includes over 40 independent functioning scales and checklists that measure appearance, QoL, outcome of treatment and satisfaction. The FACE-Q was initially developed for use in all facial cosmetic procedures. In 2016, Klassen et al. published the development and validation of a specific rhinoplasty-module, as well as an eye-module, for use in these particular patient groups. These subscales contain a reduced set of questions, making them less time consuming to complete by the patient. In future studies we suggest the comparison of this new instrument with the BOE and GBI in facial cosmetic surgery patients. To refer to the follow up question we formulated above, the next step could be to not only measure psychological health before cosmetic surgery, but also afterwards. For instance, we suggest a prospective study using the specific outcome measures of the FACE-Q, on patients with BDD symptoms seeking facial cosmetic surgery. Postoperatively, BDD measurements should be repeated, to investigate if even BDD symptoms, could be relieved by cosmetic surgery. Given the motivating results of **chapter 4.2** in this thesis and the hypothesis described above, it would be interesting to gain more knowledge in that way, about psychological relief encouraged by cosmetic surgery. In that way, we could actually improve quality of life by improving appearance.

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7 Summary

Beauty has always been pursued through the ages, but with its acceptance and the loss of its taboo, cosmetic surgery became more popular. The aim of this thesis is to explore the relationship between facial cosmetic surgery and psychological health. Patients generally indicate they are satisfied with the results of cosmetic surgery. However, certain patient characteristics have been described as negative predictors for satisfaction. Psychopathology such as Body Dysmorphic Disorder (BDD) and personality disorders are notorious. Psychosocial and cultural factors are more difficult to distinguish.

In **chapter 2**, a systematic review defines the predictors, other than BDD, of an unsatisfactory outcome following facial cosmetic surgery. The literature is also reviewed in search for a valid preoperative assessment instrument to determine these factors. Twenty-seven articles were analyzed, including eleven prospective studies, two retrospective studies, one case study, eight reviews, and five expert opinions. The systematic review of these studies has indicated the following seven possible psychosocial aspects: *male gender, young age, unrealistic expectations concerning the surgical result, unrealistic expectations concerning secondary gain, minimal deformities, narcissistic personality, and obsessive personality*.

A brief personality assessment tool that could address the predictors pre-operative was not found in the reviewed studies, which encouraged the continuation of this study by the development of such an instrument described in **chapter 5**.

In **chapter 3** and **4**, the influence of several psychological aspects on the outcome of cosmetic surgery was analyzed. Both facial cosmetic surgeons and patients benefit from knowledge about this influence. The effect of pre-operative self-consciousness of appearance on benefit after surgery in rhinoplasty patients was measured in a prospective study which is described in **chapter 3**. Patients were undergoing a (septo)rhinoplasty for a combination of cosmetic and functional problems. Before the operation, patients completed two questionnaires, the Derriford Appearance Scale (DAS59) to measure distress associated with self-consciousness of appearance and the Rhinoplasty Outcome Evaluation (ROE) to measure satisfaction with their nose. Three months after surgery they completed the ROE again and the Glasgow Benefit Inventory (GBI) to measure benefit of the surgery in daily life. 33 patients completed both pre- and postoperative questionnaires with a mean age of 28 years old. More appearance related distress was found in patients seeking rhinoplasty, compared to the general population. Patient satisfaction improved significantly after the surgery. Lower self-consciousness of appearance before surgery was positively correlated with more benefit after the surgery and a greater change in patient satisfaction with their nose. Based on the results of this study, we stated that patients who have a higher amount of psychological distress associated with self-consciousness of appearance before the operation, benefit even more from a well-executed procedure. Men seem to benefit a little less than women, even though the increase in satisfaction with their nose from the surgery is equal.

The other facial cosmetic procedure that was investigated in **chapter 4** is the most frequently performed facial cosmetic procedure worldwide. Blepharochalasis is very common and affects not only appearance but also visual function. Upper blepharoplasty is therefore very popular and it is seen as a small procedure with good patient acceptance. The prospective study described in **chapter 4.1** addresses the outcome of this procedure in terms of satisfaction and quality of life, as well as a recommendation on which assessment tools to use in this patient group. Blepharoplasty patients were requested to complete a questionnaire preoperatively and 3-6 months postoperatively. The Blepharoplasty Outcome Evaluation (BOE) and the DAS59 were used pre- and postoperatively. Visual analogue scales (VAS) were also used pre- and postoperatively to measure visual impairment and aesthetic aspects of the eyelids. The GBI was used postoperatively to measure benefit of the surgery.
Thirty-six patients with a mean age of 55 years completed all questionnaires. Satisfaction with the eyes improved significantly. Patients also reported significant benefit on the GBI after the surgery. An improvement on self-consciousness of appearance was found in the results on the DAS59. However, only the subscale 'General self-consciousness of appearance' showed a significant improvement post-operatively, the other four subscales did not correlate with the other scales. Since only this general subscale of the DAS59 seems relevant in this particular patient group, we do not suggest to use the complete scale in blepharoplasty patients. The BOE and GBI however can give an accurate insight in the functional, cosmetic and psychological outcome, while still a very brief combination of questionnaires. This study shows that a well performed upper eyelid blepharoplasty can result in great improvement on patient satisfaction, self-consciousness of appearance and benefit in daily life.
The prevalence of BDD has never been analyzed before in a bepharoplasty patient population. In **chapter 4.2**, BDD prevalence in blepharoplasty patients and its effect on satisfaction, disability in daily life, self-consciousness of appearance and benefit from the surgery is measured. BDD is a notorious mental disorder in cosmetic surgery that is related to poor postoperative outcomes. In cases of rhinoplasty, several studies have shown a high but variable BDD incidence of 20% - 33%. In the general population, the prevalence is about 1-7%. Since blepharoplasty is considered a small procedure in an older population with the main purpose of rejuvenation, BDD prevalence in blepharoplasty patients is hypothetically lower than in other cosmetic surgery patients. BDD symptoms were measured by the Body Dysmorphic Disorder Questionnaire – Aesthetic Version (BDDQ-AS) and the Body Dysmorphic Disorder Yale Brown Obsessive Compulsive Scale (BDD Y-BOCS). Patients also completed the BOE, DAS59, Sheehan Disability Scale (SDS) and GBI to measure the outcome of surgery. Thirty-six patients with a mean age of 55 years completed all questionnaires.
Twenty-five percent of our study group screened positive for BDD on the BDDQ-AS. The results of the BDD Y-BOCS showed a prevalence of 5.5% BDD in this study group. Based on literature concerning the BDDQ-AS, we believe the results on this scale to be an

overestimation. The BDD Y-BOCS seems to give a more accurate display of the presence of BDD in a blepharoplasty patient group and we therefore recommend the use of this instrument over the BDDQ-AS. This finding all the same, contradicts our hypothesis that BDD characteristics of patients requesting blepharoplasty differ from patients requesting other forms of cosmetic surgery, since the studies describing BDD in rhinoplasty patients use similar questionnaires. Preoperatively, patients with BDD symptoms were less satisfied with their eyes and scored poorer on self-consciousness than patients without BDD symptoms. Postoperatively, patients who score positive for BDD surprisingly seem to benefit as much in terms of satisfaction and self-consciousness of appearance as patients without BDD. Patients with BDD symptoms keep experiencing more disability in daily life, before as well as after the surgery. So although a surgeon should be motivated to being alert on BDD symptoms, also in blepharoplasty patients, a favorable outcome can be achieved in carefully selected patients.

As stated above, this thesis indicated the need of an assessment tool to briefly point out the presence of seven negative predictors (*male gender, young age, unrealistic expectations concerning the surgical result, unrealistic expectations concerning secondary gain, minimal deformities, narcissistic personality, and obsessive personality*) on outcome in cosmetic surgery patients. The end of this thesis introduces the Radboudumc Inventory on Negative Outcome in facial cosmetic surgery (RINO) to assess these seven factors. The main goal of **chapter 5** is to validate this newly developed questionnaire on feasibility and internal consistency in cosmetic surgery patients. A rhinoplasty patient group was chosen to conduct a first pilot study. 31 patients who underwent an open (septo)rhinoplasty were asked to preoperatively complete the RINO, as well as the ROE to measure not only the seven factors, but also satisfaction with their nose. Three months postoperatively, they were asked to complete the ROE again, and also the GBI to measure satisfaction after and benefit from the surgery. Assessing feasibility and internal consistency was the primary goal of the pilot, preliminary statistical analyses on the data were performed as well.
The RINO had a high response rate of 67%, no questions were skipped and it took only 5 minutes to complete the instrument. The RINO has therefore shown to be a highly feasible questionnaire. The RINO has a Cronbach's Alpha of 0.813, which indicates a good internal consistency of the scale. This suggests that the RINO can be a convenient instrument to implement in clinical practice. In addition to its feasibility and internal consistency, future studies should indicate whether the RINO is a good instrument to translate the unreliable 'gut feeling' of the surgeon into quantitative data, to prevent or at least reduce patient dissatisfaction after facial cosmetic surgery.

8

Samenvatting

Door de jaren heen is men altijd al op zoek geweest naar schoonheid. Cosmetische chirurgie is door betere acceptatie en verlies van taboe steeds populairder geworden de afgelopen decennia. Dit proefschrift is erop gericht om inzicht te krijgen in de relatie tussen cosmetische aangezichtschirurgie en psychologie. Doorgaans geven patiënten aan tevreden te zijn met het resultaat na cosmetische chirurgie. Echter, sommige patiënt kenmerken zijn beschreven als negatieve voorspellers voor tevredenheid. Psychopathologische aandoeningen zoals Body Dysmorphic Disorder (BDD) en persoonlijkheidsstoornissen zijn in het verleden als zodanig geïdentificeerd. Het belang van psychosociale factoren en culturele verschillen zijn een stuk moeilijker te duiden en de chirurg gebruikt tot op heden alleen de klinische presentatie en een onderbuikgevoel om deze risicofactoren in te schatten.

In **hoofdstuk 2** werden aan de hand van een systematische review de voorspellers onderzocht die in de literatuur zijn beschreven als negatieve voorspellers voor tevredenheid na cosmetische aangezichtschirurgie. Daarnaast werd gezocht naar een korte, valide vragenlijst die preoperatief kan worden afgenomen om op deze voorspellers te testen. Zevenentwintig artikelen zijn geanalyseerd, waarin elf prospectieve studies, twee retrospectieve studies, één case studie, acht reviews en vijf expert opinions werden beschreven. De systematische review van deze studies heeft de volgende zeven mogelijke negatieve voorspellers opgeleverd: *mannelijk geslacht, jonge leeftijd, onrealistische verwachtingen ten aanzien van het chirurgische resultaat, onrealistische verwachtingen ten aanzien van het dagelijks leven, minimale afwijkingen, narcistische persoonlijkheid en obsessieve persoonlijkheid.* Een korte, passende vragenlijst om deze factoren preoperatief te meten werd in de literatuur niet gevonden. Om deze reden werd een volgende studie gestart, beschreven in **hoofdstuk 5**, waarin een vragenlijst werd ontwikkeld die deze factoren op een makkelijke en snelle manier kan aantonen.

In **hoofdstuk 3** en **4** is bekeken wat de invloed is van verschillende psychologische aspecten op de uitkomst van cosmetische chirurgie. Zowel patiënten als aangezichtschirurgen profiteren ervan om dit verband te kennen, en resultaten beter te kunnen inschatten. In een prospectieve studie beschreven in **hoofdstuk 3** werd het effect van preoperatief zelfvertrouwen op tevredenheid en postoperatief profijt geanalyseerd bij neuscorrectie patiënten. Deze patiënten ondergingen over het algemeen een neuscorrectie vanwege een combinatie van cosmetische en functionele problemen. Voor de operatie werden patiënten gevraagd twee vragenlijsten in te vullen, de Derriford Appearance Scale (DAS59) waarin (hinder van) verminderd zelfvertrouwen wordt gemeten, en de Rhinoplasty Outcome Evaluation (ROE), waarin de tevredenheid met de neus wordt vastgesteld. Drie maanden na de operatie werden patiënten gevraagd opnieuw de ROE in te vullen en daarnaast de Glasgow Benefit Inventory (GBI) welke kijkt naar het profijt wat patiënten hebben van een operatie in het dagelijks leven. In vergelijking met de normale populatie hebben neuscorrectie patiënten significant meer hinder van uiterlijk zelfbewustzijn. Patiënten waren wel significant meer tevreden met hun neus na de operatie. Het hebben van minder zelfvertrouwen preoperatief was gecorreleerd met een hogere mate van profijt in het dagelijks leven postoperatief en

een grotere verbetering van de tevredenheid met de neus. Gebaseerd op de resultaten van deze studie kunnen we concluderen dat patiënten die verminderd zelfvertrouwen hebben voor een neuscorrectie, zelfs meer profijt hebben in hun dagelijks leven van een succesvolle procedure. In deze studie lijken mannen iets minder profijt te ondervinden van de operatie dan vrouwen, ondanks dat mannen wel aangeven net zo tevreden te zijn met het resultaat.
Een andere cosmetische operatie waar naar gekeken is in **hoofdstuk 4** van dit proefschrift staat bekend als de meest frequent uitgevoerde cosmetische ingreep wereldwijd. Blefarochalasis (hangende bovenoogleden) is een aandoening waar veel mensen last van hebben, niet alleen qua cosmetiek, maar ook visueel. Bovenooglidcorrecties zijn daarom erg populair en het wordt beschouwd als een kleine, makkelijk uitvoerbare ingreep welke goed geaccepteerd wordt door de patiënt. In **hoofdstuk 4.1** wordt een prospectieve studie beschreven welke de uitkomsten analyseert bij patiënten die een bovenooglidcorrectie ondergaan. Hierin werd gekeken naar tevredenheid en kwaliteit van leven, maar ook naar een bruikbare vragenlijst voor deze patiëntencategorie. Aan bovenooglidcorrectie patiënten werd gevraagd om zowel voor als 3-6 maanden na de operatie verschillende vragenlijsten in te vullen. Pre- en postoperatief werden de Blepharoplasty Outcome Evaluation (BOE) en de DAS59 gebruikt. Verschillende Visual Analogue Scales (VAS) werden voor en na de operatie gebruikt om visuele beperkingen en cosmetische bezwaren vast te leggen. De GBI werd na de operatie gebruikt om profijt in het dagelijks leven te meten. Zesendertig patiënten met een gemiddelde leeftijd van 55 jaar oud voltooiden alle vragenlijsten. Zij toonden een significante verbetering in tevredenheid met hun oogleden. Ook gaven patiënten aan profijt te hebben van de ingreep in het dagelijks leven. Het uiterlijk zelfbewustzijn gemeten met de DAS59 verbeterde; echter, alleen de algemene zelfbewustzijn schaal van de DAS59 liet een verschil zien. De andere vier subschalen toonden dit niet en deze correleerden ook niet met de uitkomsten van de andere vragenlijsten in deze studie. Omdat slechts één van de vijf subschalen relevant lijkt in deze patiënten groep adviseren wij om niet de DAS59 te gebruiken in toekomstige studies met bovenooglidcorrectie patiënten. De BOE en de GBI kunnen wel inzicht verschaffen in de functionele, cosmetische en psychologische uitkomsten van een bovenooglidcorrectie en zijn kort en snel in gebruik. Deze studie heeft aangetoond dat een goed uitgevoerde bovenooglidcorrectie kan resulteren in een grote vooruitgang in tevredenheid met de oogleden, uiterlijk zelfbewustzijn en profijt in het dagelijks leven van de patiënt.
De prevalentie van BDD is nooit eerder onderzocht onder bovenooglidcorrectie patiënten. In **hoofdstuk 4.2**, wordt een prospectieve studie beschreven waarin de prevalentie van BDD onder bovenooglidcorrectie patiënten werd geanalyseerd, in combinatie met de invloed van BDD symptomen op patiënt tevredenheid, beperkingen in het dagelijks leven, uiterlijk zelfbewustzijn en profijt van de ingreep. BDD is berucht in de cosmetische chirurgie als een mentale aandoening welke is gerelateerd aan slechte postoperatieve tevredenheid. De prevalentie van BDD onder neuscorrectie patiënten is in verschillende studies beschreven en ligt tussen de 20-33%. Onder de normale populatie is deze prevalentie zo'n 1-7%. Een bove-

nooglidcorrectie wordt over het algemeen gezien als een kleine ingreep bij oudere patiënten met als doel wat verjonging van het uiterlijk. Daarom is de hypothese dat BDD minder voorkomt in deze groep in vergelijking met patiënten die andere cosmetische ingrepen ondergaan, zoals neuscorrectie patiënten.
Symptomen van BDD zijn gemeten middels de Body Dysmorphic Disorder Questionnaire – Aesthetic Version (BDDQ-AS) en de Body Dysmorphic Disorder Yale Brown Obsessive Compulsive Scale (BDD Y-BOCS). Daarnaast werden patiënten gevraagd om de BOE, DAS59, Sheehan Disability Scale (SDS) en GBI in te vullen rondom de operatie om de subjectieve uitkomst van de operatie te meten. Vijfentwintig procent van de studiegroep scoorde positief voor BDD op de BDDQ-AS. De resultaten van de BDD Y-BOCS lieten echter een veel lagere prevalentie van 5.5% zien. Gebaseerd op de beschikbare literatuur met betrekking op de BDDQ-AS, lijkt de gemeten prevalentie op deze schaal waarschijnlijk overschat. De BDD Y-BOCS lijkt een betere inschatting te geven van de werkelijke BDD prevalentie. Daarom adviseren wij de BDD Y-BOCS te gebruiken in plaats van de BDDQ-AS in toekomstige studies over dit onderwerp. Hoe dan ook spreken deze resultaten wel onze hypothese tegen dat BDD minder vaak voorkomt bij bovenooglidcorrectie patiënten. De studies over BDD bij neuscorrectie patiënten gebruiken namelijk veelal dezelfde vragenlijsten.
Patiënten met BDD symptomen zijn voorafgaand aan de operatie significant minder tevreden met hun ogen en hebben meer hinder van zelfbewustzijn dan patiënten zonder symptomen van BDD. Na de operatie is er echter geen verschil meer te meten in tevredenheid en zelfbewustzijn tussen deze twee groepen. Patiënten met BDD symptomen houden echter wel meer beperkingen in het dagelijks leven als gevolg van hun afwijking zowel voor als na de operatie. Hieruit blijkt dus dat alhoewel BDD bijna net zo vaak lijkt voor te komen bij bovenooglidcorrectie patiënten, er bij geselecteerde patiënten wel een goede uitkomst bereikt kan worden na de operatie.

Zoals boven beschreven was er behoefte aan een vragenlijst waarmee de zeven negatieve voorspellers voor tevredenheid na cosmetische chirurgie kunnen worden getest. Deze voorspellers zijn: *mannelijk geslacht, jonge leeftijd, onrealistische verwachtingen ten aanzien van het chirurgische resultaat, onrealistische verwachtingen ten aanzien van het dagelijks leven, minimale afwijkingen, narcistische persoonlijkheid en obsessieve persoonlijkheid.*
Het laatste hoofdstuk van dit proefschrift introduceert de Radboudumc Inventory on Negative Outcome in facial cosmetic surgery (RINO), om deze voorspellers te meten. Het belangrijkste doel van **hoofdstuk 5** was de validatie van dit nieuw ontwikkelde instrument met betrekking tot haalbaarheid en betrouwbaarheid bij patiënten die cosmetische chirurgie ondergaan. Er is een pilot studie uitgevoerd waarbij 31 neuscorrectie patiënten werden gevraagd om mee te doen. Zij hebben preoperatief de RINO en de ROE ingevuld om niet alleen de zeven factoren maar ook tevredenheid met de neus te meten. Postoperatief hebben

zij nogmaals de ROE ingevuld, samen met de GBI, om profijt van de operatie te meten. Haalbaarheid en betrouwbaarheid van de RINO was het eerste doel van deze pilot studie, maar ook preliminaire uitkomsten zijn bekeken. De RINO had een hoge respons van 67%, er werden geen vragen overgeslagen en de complete invultijd was gemiddeld 5 minuten. Dit maakt de RINO een zeer goed haalbare en praktische vragenlijst. De RINO had een Cronbach's alpha van 0.81 wat duidt op een zeer goede interne consistentie van de vragenlijst. De vragenlijst is als digitale vragenlijst te gebruiken in neuscorrectie patiënten, waardoor het gemakkelijk is in te passen in de dagelijkse praktijk. Nu de vragenlijst haalbaar is bevonden en een goede interne consistentie heeft kunnen volgende stappen worden gezet in toekomstige studies, waarbij in een grotere steekproef moet worden gekeken naar validiteit. Op deze manier zal duidelijk worden of het onbetrouwbare onderbuikgevoel van de chirurg kan worden omgezet naar een objectief meetbare score waarmee de postoperatieve tevredenheid kan worden voorspeld. Om op deze manier in de toekomst, postoperatieve ontevredenheid na cosmetische chirurgie te kunnen voorkomen.

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Curriculum Vitae

Jasmijn Marianne Herruer was born in Heemstede on the 23rd of December 1985. She lived with her parents and older brother in Bennebroek for a few years, after which she grew up in Gorssel (Gelderland) and later Heemskerk (Noord-Holland). In 2004 she graduated from high school in Beverwijk (Kennemer College) and started medical school at the Leiden University. Alongside her study, she worked for the Multi Tissue Center ETB-BISLIFE as a tissue explantor. In her last year of medical school she completed a scientific internship at the Otolaryngology, Head and Neck surgery department of the Leiden University Medical Center on quality of life in vestibular schwannoma patients.

In 2011, Jasmijn graduated from medical school and started as a House Officer in the department of Surgery at Haaglanden Medical Center in The Hague. Three months later she started her residency in Otolaryngology, Head and Neck surgery at the Radboud university medical center in Nijmegen, under the supervision of prof. dr. H.A.M. Marres and dr. F.J.A van den Hoogen. She set up the current research project at the same time as her residency under supervision of dr. K.J.A.O Ingels. After completion of her residency, she started a two-year fellowship in Head and Neck oncology. The first year she focused on ablative head and neck oncologic surgery at the center of Head and Neck oncology of the Radboud university medical center in Nijmegen. She is currently attending the Dalhousie University Head and Neck Oncology fellowship in Halifax, Canada, focusing additionally on head and neck reconstruction, including reconstructive microsurgery.